

**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

**FORM 10-K**

(Mark One)

**ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2017

OR

**TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number: 001-36481

**ASPEN AEROGELS, INC.**

(Exact name of registrant as specified in its charter)

Delaware  
(State or other jurisdiction of  
incorporation or organization)  
30 Forbes Road, Building B  
Northborough, Massachusetts  
(Address of principal executive offices)

04-3559972  
(I.R.S. Employer  
Identification No.)

01532  
(Zip Code)

Registrant's telephone number, including area code (508) 691-1111  
Securities registered pursuant to Section 12(b) of the Exchange Act:

Title of each class

Name of each exchange on which registered

Common Stock, par value \$0.00001 per share

New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Exchange Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes  No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act. Yes  No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes  No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes  No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer", "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer

Non-accelerated filer  (Do not check if a smaller reporting company)

Accelerated filer

Smaller reporting company

Emerging growth company

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes  No

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant (without admitting that any person whose shares are not included in such calculation is an affiliate) computed by reference to the price at which the common stock was last sold as of the last business day of the registrant's most recently completed second fiscal quarter was approximately \$86.6 million.

As of February 27, 2018, the registrant had 23,643,189 shares of common stock outstanding.

**DOCUMENTS INCORPORATED BY REFERENCE**

Portions of the registrant's definitive Proxy Statement for its Annual Meeting of Stockholders to be held on June 20, 2018 are incorporated by reference into Part III of this Annual Report on Form 10-K to the extent stated herein.

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## PART I

### Item 1. BUSINESS

Aspen Aerogels, Inc. is an aerogel technology company that designs, develops and manufactures innovative, high-performance aerogel insulation used primarily in the energy infrastructure and building materials markets. The Company also conducts research and development related to aerogel technology supported by funding from several agencies of the U.S. government and other institutions. When used in this report, the terms “we,” “us,” “our” and “the Company” refer to Aspen Aerogels, Inc. and its subsidiaries.

We design, develop and manufacture innovative, high-performance aerogel insulation. We believe our aerogel blankets deliver the best thermal performance of any widely used insulation product available on the market today and provide a combination of performance attributes unmatched by traditional insulation materials. Our products provide two to five times the thermal performance of widely used traditional insulation in a thin, easy-to-use and durable blanket form. Our end-use customers select our products where thermal performance is critical, and to save money, improve resource efficiency, preserve operating assets and protect workers.

Our technologically advanced products are targeted at the estimated \$3.1 billion annual global market for energy infrastructure insulation materials. Our aerogel insulation has undergone rigorous technical validation and is used by many of the world’s largest oil producers and the owners and operators of refineries, petrochemical plants, liquefied natural gas facilities and power generating and distribution assets, such as ExxonMobil, PTT LNG, Dominion Resources and Royal Dutch Shell. Our products replace traditional insulation in existing facilities during regular maintenance, upgrades and capacity expansions. In addition, our aerogel products are increasingly being specified for use in new-build energy infrastructure facilities.

We introduced our two key product lines, Pyrogel and Cryogel in 2008. Our product revenue has grown from \$17.2 million in 2008 to \$109.6 million in 2017, representing a nine year compound annual growth rate of 23%. During this period, we have sold more than \$719 million of our products globally, representing an installed base of more than 279 million square feet of insulation. We believe that this initial success positions us for future growth and continued gain in market share.

We currently focus our commercial efforts in the energy infrastructure market, where we believe our products have the highest value applications. We also market and sell aerogel products for use within the building materials market. As we continue to enhance our aerogel technology platform, we believe we will have opportunities to address additional high value applications in the global insulation market and in a diverse set of new markets.

We have grown our business by forming technical and commercial relationships with industry leaders, which has allowed us to optimize our products to meet the particular demands of targeted market sectors. We have benefited from our technical and commercial relationships with ExxonMobil in the oil refinery and petrochemical sector, with TechnipFMC in the offshore oil sector and with BASF in the building materials market. We will continue our strategy of working with innovative companies to target and penetrate additional market opportunities.

Our patented aerogel product and manufacturing technologies are significant assets. Aerogels are complex structures in which 97% of the volume consists of air trapped between intertwined clusters of amorphous silica solids. These extremely low density solids provide superior insulating properties. Although aerogels are usually fragile materials, we have developed innovative and proprietary manufacturing processes that enable us to produce industrially robust aerogel insulation cost-effectively and at commercial scale.

Our products help customers to improve the resource efficiency and sustainability of their operations. Our products also enable compact system design, reduce installation time and costs, promote freight and logistics cost savings, reduce system weight and required storage space and enhance job site safety. Our products reduce the incidence of corrosion under insulation, which is a significant maintenance cost and safety issue in energy infrastructure facilities. Many of our products also offer strong fire protection, which is a critical performance requirement in our markets. We believe our array of product attributes provides strong competitive advantages over traditional insulation. Although competing insulation materials may have one or more comparable attributes, we believe that no single insulation material currently available offers all of the properties of our aerogel insulation products.

Total revenue for the years ended December 31, 2017, 2016 and 2015 was \$111.6 million, \$117.7 million and \$122.5 million, respectively. For the years ended December 31, 2017, 2016 and 2015, based on shipment destination or research services location, our U.S. revenue was \$51.4 million, \$35.7 million and \$44.5 million, respectively, and our international revenue was \$60.2 million, \$82.0 million and \$78.0 million, respectively.

We manufacture our products using proprietary technology at our facility in East Providence, Rhode Island. We have operated the East Providence facility since 2008 and have significantly increased manufacturing capacity and productivity since that date. We

commenced operation of our third production line in the East Providence facility in 2015 which increased our annual nameplate capacity to 50 million square feet of aerogel blankets. We have initiated a series of projects designed to increase this capacity to 60 million square feet of aerogel blankets by the end of 2020. We have also completed the design and engineering of the first production line in a planned second manufacturing facility to be located in Statesboro, Georgia supported by a package of incentives from the State of Georgia and local governmental entities. We have elected to delay construction of the Statesboro facility to better align the timing of this capacity expansion with our assessment of future demand.

Financial information about our product and research services revenues, net loss per share and our total assets are provided in our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

## **Our Markets and Competition**

Our core market is the energy infrastructure insulation market. This market is global, well-established and includes large and well-capitalized end-users. This market includes companies operating refinery, petrochemical, oil production, LNG production and storage facilities. The market also includes firms operating gas, coal, nuclear, hydro and solar thermal power generating plants and district energy systems. Insulation systems in the energy infrastructure market are designed to maintain hot and cold process equipment, piping and storage tanks at optimal temperatures, to protect plant and equipment from the elements and from the risk of fire, and to protect workers. The market is served by a well-organized, well-established, worldwide network of distributors, contractors and engineers.

Demand for insulation in the energy infrastructure market is composed of demand associated with new-build construction of facilities, capital expansions and related capital projects, as well as with routine, non-discretionary maintenance programs within existing facilities. Capital expansions and related capital projects in the energy infrastructure market are driven primarily by overall economic growth and projected growth in energy demand. Maintenance programs are essential to optimal operation of process equipment, to protect workers and to minimize the risk of a catastrophic loss. Accordingly, we believe that demand for insulation for maintenance purposes in comparison to capital projects is less affected by volatility associated with economic cycles, energy prices and other macroeconomic factors.

The major end-use markets that drive demand for our products include oil refining, petrochemical, natural gas and LNG production and storage, onshore oil production, offshore oil production and power generation. Global energy demand is expected to increase in the long-term and, in order to serve this growing demand, we believe our end-use customers will continue to invest in major energy infrastructure projects.

We also sell our products for use in the building materials and other end markets, including for the fabrication of insulation parts by original equipment manufacturers, or OEMs. These OEMs develop products incorporating our aerogel blankets for applications as diverse as military and commercial aircraft, trains, buses, appliances, apparel, footwear and outdoor gear. While these are not presently our core markets, we anticipate that we will allocate a growing portion of our manufacturing capacity to serve these markets in the long term. We believe the key performance criteria for insulation in these markets and applications include thermal performance, compact design, durability and fire resistance.

We operate in a highly competitive environment. In general, we compete with traditional insulation materials based on product performance, price, availability and proximity to the customer. Customers may choose among a variety of insulation materials that offer a range of characteristics including thermal performance, durability, vapor permeability, moisture resistance, ease of installation and upfront and lifecycle costs. Within each type of insulation material, there is also competition between the manufacturers of that material. Most types of traditional insulation materials are produced by a number of different manufacturers and once customers have chosen the type of insulation material that they intend to use, they will choose a manufacturer of that material based primarily on each manufacturer's price and delivery schedule. Insulation manufacturers include a range of large, high-volume, multinational manufacturers offering branded products and strong technical support services to small, low-volume, local manufacturers offering low prices and limited customer support.

We believe the primary competitive factors in our market are:

- product performance (along multiple criteria), quality and fitness for purpose;
- product price, installed cost and lifecycle cost;
- product availability; and
- proximity to customer and logistics.

Our products are priced at a premium to traditional insulation materials. While our competitors offer many traditional insulation products that are priced below our products on a per-unit basis, we believe our products have superior performance attributes and may have the lowest cost on a fully-installed basis or offer significant life-cycle cost savings.

We compete in the aerogel insulation market with Cabot Corporation and a growing number of other competitors, including Guangdong Alison Hi-Tech Co., Ltd. and Nano Tech Co., Ltd. that manufacture and sell aerogel insulation products. We expect to face increasing competition in the aerogel insulation market over the next several years as existing competitors and new entrants seek to develop and market their own aerogel products.

Within each of our target markets, we encounter one or more of these organizations or their resellers and a significant number of other aggressive national, regional and local suppliers of traditional insulation products. Our competitors are seeking to enhance traditional insulation materials and to develop and introduce new and emerging insulation technologies. Competing technologies that outperform our insulation products in one or more performance attributes could be developed and successfully introduced. See “Risk Factors —The energy infrastructure insulation market is highly competitive; if we are unable to compete successfully, we may not be able to increase or maintain our market share and revenues.”

Our market share in 2017 was less than 4% of the estimated \$3.1 billion annual global market for energy infrastructure insulation materials. Many of our competitors have greater market presence, larger market share, longer operating histories, stronger name recognition, larger customer bases and significantly greater financial, technical, sales and marketing, manufacturing and other resources than we have and may be better able to withstand volatility within the industry and throughout the economy as a whole while retaining greater operating and financial flexibility. If our competitors lower their prices, or develop new products with better performance, or if we are unable to compete effectively, our growth opportunities, share of the market, margins and profitability may decline.

### **Our Competitive Strengths**

Because insulation is used in a wide variety of demanding applications, insulation materials must satisfy a wide range of performance criteria on a cost-effective basis. We believe that our aerogel technology has allowed us to create superior insulation products for our core markets that will allow us to continue to grow our share of the global insulation market. We believe that the potential for significant technological innovation in traditional insulation materials is limited and that new high-performance materials will be required to meet evolving market requirements for energy efficient insulation systems. Our line of high-performance aerogel blankets is positioned to meet these requirements. Our solution is driven by our innovative and proprietary technology that produces aerogels in a flexible and industrially robust blanket form and is supported by over 20 years of research and development dedicated to new aerogel compositions, form factors and manufacturing technologies. We believe our aerogel blankets deliver a superior combination of performance attributes that enable end-users to save money, improve resource efficiency, preserve operating assets and protect workers across a wide range of applications in our target markets.

We believe the following combination of capabilities distinguishes us from our competitors and positions us to continue to gain market share in the energy infrastructure insulation market:

- ***Disruptive Products with a Compelling Value Proposition.*** Our aerogel products provide two to five times the thermal performance of widely used traditional insulation in a thin, easy-to-use and durable blanket form. We believe our array of product attributes provides strong competitive advantages over traditional insulation and will enable us to gain a larger share of the energy infrastructure insulation market. Although competing insulation materials may have one or more comparable attributes, we believe that no single insulation material currently available offers all of the properties of our aerogel insulation.
- ***Important Energy End Markets.*** Our products are primarily used in large scale energy infrastructure facilities. Given continued growth in global energy consumption in the long-term, and the construction of new facilities to satisfy this demand, we believe that we serve well capitalized and growing global end markets. In order to capture the opportunities in our end markets, we have a network of sales professionals and qualified distributors in more than 40 countries around the world.
- ***Growing Installed Base with Industry-leading End-Users.*** We have an installed base of more than 279 million square feet of insulation, representing more than \$719 million in cumulative product sales since 2008. Through our relationships with industry leading end-use customers, our products have undergone rigorous testing and technical validation and are now in use at many of the world’s largest oil producers, refiners and petrochemical companies. These relationships have shortened the sales cycle with other customers and have helped to facilitate our market penetration. We also have strong relationships with a global network of energy-focused distributors, contractors and engineering firms that understand the significant advantages our products provide to end-users.

- **Proven, Scalable Business Model.** Our proprietary manufacturing technology is proven and has been successfully scaled up to meet increasing demand. We have operated the East Providence facility since 2008 and have significantly increased manufacturing capacity and productivity during the period. We successfully commenced operation of our second production line at this facility in March 2011 and doubled our annual nameplate capacity to 40 million square feet of aerogel blankets. We commenced operations of a third line in the East Providence facility during the first quarter of 2015 which increased our annual nameplate capacity by 25% to 50 million square feet of aerogel blankets.
- **Protected Technology Platform and Proprietary Manufacturing Capability.** Our aerogel technology platform is the result of more than 20 years of research and development dedicated to new aerogel compositions, form factors and manufacturing technologies. Our intellectual property portfolio is supported by 107 issued patents, with an additional 102 pending, in U.S. and foreign jurisdictions in areas related to product design, chemistry, process technology and market applications. In addition, we have significant know-how and trade secrets related to product formulations and manufacturing techniques. We believe our portfolio of patents, trade secrets and know-how presents a barrier to potential new entrants in the commercialization of aerogel blanket insulation.
- **Experienced Management Team with a Demonstrated Track Record.** Our executive officers have an average of more than 20 years each of experience in global industrial companies, specialty chemical companies or related material science research. This management team is responsible for the continued development of our aerogel technology platform, the commercial acceptance of our products, and the creation of a global distribution and marketing platform. As of December 31, 2017, we employed 263 people including material scientists, engineers, manufacturing line operators, sales personnel, administrative staff, and management. We believe our dedicated and experienced team is an important competitive asset.

## Our Growth Strategy

We are targeting continued expansion of the use of our products within energy infrastructure facilities during regular maintenance, upgrades and expansions. In addition to opportunities to replace traditional insulation at existing facilities, we are also pursuing insulation applications at new-build and large capacity expansion projects around the world.

Our strategy is to create economic value by leveraging our technological and market leadership in aerogels to be the premier provider of high-performance insulation products serving global energy infrastructure customers. We also will pursue high-value opportunities for our aerogel products within other segments of the global insulation market, including the building materials market. In addition, we will leverage our aerogel technology platform to develop innovative, aerogel enhanced products for applications outside the global insulation market. During 2018, we intend to invest approximately \$6.0 million in incremental manufacturing and operating expense with the objective of restoring long-term growth in our existing markets and to develop new business opportunities. This incremental expense is associated, in large part, with our plan to add 49 new employees to our team during the year.

Key elements of our strategy include:

- **Broaden Energy Market Diversity and Grow Market Share.** We plan to focus additional resources to continue to grow our share of the energy infrastructure insulation market, both through increased sales to our existing customers and through sales to new customers. We plan to continue to expand our global sales and distribution network and seek to promote greater enterprise-wide adoption of our products by existing end-use customers. To date, the majority of our revenue has been generated from applications in refineries and petrochemical facilities. We will continue to pursue and expect greater adoption of our products in district heating, LNG production and storage, and power generation markets. In addition, our product revenue has been and will continue to be generated in large part by demand for insulation associated with scheduled plant shutdowns, or turnarounds, and other maintenance-related projects. With broad adoption of our products and our growing installed base, we expect that our products will be specified at increasing rates during the design phase in a growing number of new-build and capital expansion projects. We also expect that growth in global energy demand over time will result in increased new-build and large capacity expansion projects, driving demand for our aerogel products.
- **Leverage Strategic Relationships in the Building Materials Market.** We are pursuing market opportunities with leading building materials manufacturers and distributors across multiple regions to address the increasingly stringent regulatory environment governing the thermal performance of buildings. We have entered into a multi-faceted strategic partnership with BASF to develop and commercialize products optimized for the building materials market. The strategic partnership offers a near-term commercial opportunity through the sale of our Spaceloft A2 product line and long-term commercial potential through our joint development efforts focused on innovative products and technologies. We believe our strategic

partnership with BASF will facilitate our penetration of the building materials market by combining the strength of our aerogel technology platform with BASF's broad technical, commercial and distribution capabilities.

- **Capitalize on Innovation to Develop New Markets.** Our team of materials scientists and engineers focus on advancing our aerogel technology platform and developing next generation aerogel compositions, form factors and manufacturing processes. We believe that we are well positioned to leverage over 20 years of research and development to develop and commercialize disruptive aerogel products for a wide array of new markets beyond energy infrastructure and building materials. We will seek to exploit the unique characteristics of aerogels, including low thermal conductivity, high surface area, high electrical conductivity, and tunable porosity, to develop aerogel enhanced products and next generation technology addressing complex and unmet market needs. We will continue to seek potential partnerships with industry leaders that include a mix of commercial, technical and financial elements to realize the full potential offered by our proprietary aerogel technology platform in targeted markets.
- **Strategically Increase Capacity to Meet Demand.** Demand for our aerogel products has grown significantly since our inception. From 2008 through 2017, our product revenue has grown at a compound annual growth rate of 23% to \$109.6 million. To meet growth in demand for our products, we added a third production line in our East Providence facility in 2015 which increased our annual nameplate capacity to 50 million square feet of aerogel blankets. We have initiated a series of projects designed to increase the nameplate capacity of the East Providence facility by an additional 10 million square feet of aerogel blankets by the end of 2020 at a projected cost of between \$15 million and \$20 million. In addition, we have completed the design and engineering of a planned first production line in a second manufacturing facility to be constructed in Statesboro, Georgia. We currently expect the first line will increase our annual nameplate capacity by approximately 40 million square feet of aerogel blankets for a cost of between \$120 million and \$130 million. We have elected to delay construction of the Statesboro facility to better align the timing of this capacity expansion with our assessment of future demand.
- **Enhance Our Profit Margins, Operational Cash Flow and Return on Invested Capital.** We will seek to continuously improve the cost efficiency of our manufacturing process, to optimize the formulation of our products and to manage our supply chain to reduce costs. We believe additional opportunities to realize production efficiencies and to reduce per unit overhead costs will arise with growth in the scale of our manufacturing operations. We believe our current expansion plans will enhance profit potential, increase operating cash flow capability, and offer attractive returns on incremental invested capital. In addition, we will focus our development efforts on new products and next generation technology with application in new, high value market segments.

## Our Products

Aerogels are highly porous structures in which 97% of the volume consists of air trapped between intertwined clusters of amorphous silica solids. Aerogels are a very low density solids and are extremely fragile materials. However, our proprietary manufacturing process produces aerogels in a flexible, resilient, durable and easy-to-use blanket form.

The core raw material in the production of our aerogel products is silica precursors. Our manufacturing process initially creates a semi-solid alcogel in which the silica structure is filled with ethanol. We produce aerogel by means of a supercritical extraction process that removes ethanol from the gel and replaces it with air. Our process allows the ethanol to be extracted without causing the solid matrix in the gel to collapse from capillary forces.

Our material costs were 45%, 41% and 45% of product revenue for the years ended December 31, 2017, 2016 and 2015, respectively. We are seeking to lower our manufacturing costs and to improve the per square foot costs of our aerogel blankets by optimizing our formulations and manufacturing processes to improve yields, by realizing price reductions from existing vendors, by qualifying new vendors for certain materials and by reducing shipping costs. Our objective is both to reduce costs to enhance our competitive advantage and to ensure we deliver high quality products to our customers.

The materials used in the production of our products consist primarily of fiber battings, silica precursors and ethanol, which is used in the delivery of the silica precursors. Multiple sources of supply exist for all of our raw materials, and we believe the markets for these products are competitive and prices are relatively stable. We purchase silica precursors from several suppliers. Based on the current level of demand for our products, we believe that an adequate long-term supply of silica precursors is available. However, if demand for our products increases rapidly, we will need to work with suppliers to ensure that an adequate long-term supply of silica precursors will be available at competitive prices. Suppliers of silica precursors include industrial companies that produce it directly or that produce it as a byproduct of other industrial processes. We are working with a number of these suppliers to plan for our potential future needs and to develop processes to reduce the long-term cost of these materials. See "Risk Factors — Shortages of the raw materials used in the production of our products, increases in the cost of such materials or disruptions in our supply chain could adversely impact our financial condition and results of operations."

Our aerogel blankets are reinforced with fiber batting. We manufacture and sell our blankets in 60 inch wide, three foot diameter rolls with a standard range of thickness of 5 millimeters to 10 millimeters. Our base products are all flexible, hydrophobic, vapor permeable, compression resistant and able to be cut and fabricated using conventional tools. We have specifically developed our line of aerogel blankets to meet the requirements of a broad set of applications within our target markets. The composition and attributes of our standard aerogel blankets are described below:

### ***Energy Infrastructure Markets***

- ***Pyrogel XT-E.*** Pyrogel XT-E, our best-selling product, is reinforced with a glass-fiber batting and has an upper use temperature of 650° C. Pyrogel XT-E was initially designed for use in refineries and petrochemical facilities, but has proven to have wide applicability throughout the energy infrastructure market. Pyrogel XT-E is optimized for high temperature applications between 100° C and 400° C. Pyrogel XT-E's hydrophobicity and vapor permeability reduce the risk of corrosion under insulation in energy infrastructure operating systems when compared to traditional insulation.
- ***Pyrogel HPS.*** Pyrogel HPS is optimized for applications within the power generation market with operating temperatures greater than 400° C. With an upper use temperature of 650° C, high durability and extremely low thermal conductivity, Pyrogel HPS is ideal for installation in high performance turbine systems and in demanding thermal environments in power plants and systems. Pyrogel HPS also provides strong value at high temperatures and in demanding thermal applications in refining and chemical processing systems.
- ***Pyrogel XTF.*** Pyrogel XTF provides thermal performance similar to Pyrogel XT, but is reinforced with a glass- and silica-fiber batting. Pyrogel XTF is specially formulated to provide strong protection against fire.
- ***Cryogel Z.*** Cryogel Z is designed for sub-ambient and cryogenic applications in the energy infrastructure market. Cryogel Z is reinforced with a glass- and polyester-fiber batting and is produced with an integral vapor barrier. Cryogel Z is also specially formulated to minimize the incidence of stress corrosion cracking in stainless steel systems. Cryogel Z's combination of properties allow for simplified system designs and reduced installation costs in cold applications throughout the energy infrastructure market when compared to traditional insulation.
- ***Spaceloft Subsea.*** Spaceloft Subsea is reinforced with glass- and polyester-fiber batting and is designed for use in pipe-in-pipe applications in offshore oil production. Spaceloft Subsea is typically fabricated and pre-packaged to permit faster installation. Spaceloft Subsea allows for small profile carrier pipelines and associated reductions in capital costs.

### ***Other Markets***

- ***Spaceloft Grey.*** Spaceloft Grey is reinforced with a glass- and polyester- fiber batting and is designed for use in the building materials market. Spaceloft Grey is either utilized in roll form by contractors in the field or fabricated by OEMs into strips, panels and systems that meet industry standards. Spaceloft Grey is designed for use in solid wall buildings and where space is at a premium. Spaceloft A2, a variant of Spaceloft Grey, is reinforced with a glass-fiber batting and specifically designed to meet Euroclass A2 fire standards.
- ***Cryogel X201.*** Cryogel X201 is similar in composition to Cryogel Z, but is produced without the integral vapor barrier. Cryogel X201 is designed for use in cold system designs where space is at a premium. Cryogel X201 is targeted to OEMs that design, produce and sell refrigerated appliances, cold storage equipment and aerospace systems.

### ***R-Values by Material***

Insulation is a material or combination of materials that slows the transfer of heat from one side of the material to the other. The composition of our aerogel products minimizes the three mechanisms of thermal transport:

- ***Conduction.*** Heat conduction through a material is correlated to the material's density. Aerogels are very low density solids. As a result, thermal conductivity through the aerogel material itself is extremely low.
- ***Convection.*** Heat convection in gases is through movement of gas molecules. Due to the restricted movement of gases in the aerogel structure, thermal convection is eliminated inside the aerogels.
- ***Radiation.*** Radiation requires no medium to transfer the heat. Thermal radiation is partially absorbed by aerogels. Our aerogel products also contain infrared absorbing additives to significantly reduce radiant heat transfer.

We believe our aerogel products offer the lowest levels of thermal conductivity, or best insulating performance, of any widely used insulation available on the market today.



The lower a material's thermal conductivity, the more slowly heat is transferred through the material. R-values are a commonly used measure of an insulating material's resistance to heat transfer. R-value is calculated as the thickness of an insulation material divided by the thermal conductivity of the insulation material. Materials with higher R-values have lower thermal conductivity and are better insulators. Traditional and specialty insulation materials provide a range of R-values. Aerogels have the highest R-value per unit of thickness in comparison to traditional insulation materials.

### ***Qualification for Use***

Our products have undergone rigorous testing and are now qualified for global usage in both routine maintenance and in capital projects at many of the world's largest oil producers, refiners and petrochemical companies. These end-users of our products have well defined practices, codes, specification and standards for materials and systems installed or used in their facilities. These specifications include insulation system design standards, material qualification and selection processes, and insulation application practices. As part of the material qualification process established by these companies, a new insulation product must meet general industry standards, such as consensus standards developed by ASTM International, and, in some cases, company-specific internal standards to be considered for use. In addition, most of these companies require one or more field trials to evaluate fitness for use in specific applications. The companies either run these qualification processes and field trials internally or through third parties engaged by them, and they generally do not publicly disclose the results of their testing. While the specific processes and timelines vary from company to company, in general, upon successful completion of the qualification process for an insulation product, an end-user will typically deem the product to be qualified for use in its facilities on a local, regional or global basis for one or more applications. Because our end-use customers are typically businesses with very large operations in multiple sites, our insulation sales likely represent only a small portion of the total insulation used by any one of these companies. Accordingly, once our products are qualified at a company, we continue to seek to expand use of our products by the end-use customer in additional applications and at multiple locations.

### **Our Sales Channel**

We market and sell our products primarily through our global sales force. Our sales personnel are based in North America, Europe and Asia and travel extensively to market and sell our products to new and existing customers. The efforts of our sales force are supported by a small number of sales consultants with extensive knowledge of a particular market or region. Our sales force establishes and maintains customer and partner relationships, delivers highly technical information and provides first class customer service. We plan to expand our sales force globally to support anticipated growth in customers and demand for our products.

Our sales force calls on and maintains relationships with participants at all levels of the insulation industry supply chain. We have established a network of insulation distributors to ensure rapid delivery of our products in critical regions. Our sales personnel work to educate insulation contractors about the technical and operating cost advantages of aerogel blankets. Our sales force works directly with end-users and engineering firms to promote qualification, specification and wider acceptance of our products in existing and new applications. In the energy infrastructure market, we rely heavily on the existing and well-established channel of distributors and contractors to deliver products to our customers. In addition, our sales personnel work with OEMs and strategic partners to create new products and solutions to expand our market reach.

The sales cycle for a new insulation material is typically lengthy. Our sales cycle from initial customer trials to widespread use can take from one to three years, although we typically realize increasing revenue at each stage in the cycle. We believe our relationships with technically sophisticated customers and strategic partners serve to validate our technology, products and value proposition within a target market. These relationships have proven to accelerate the sales cycle with other customers within specific markets and to facilitate growth in market share. We have focused our marketing efforts on developing technical support materials, installation guides, case studies and general awareness of the superior performance of our aerogel blankets. We rely on our website, printed technical materials, participation in industry conferences and tradeshows and presentation of technical papers to communicate our message to existing and potential customers. We also receive strong word-of-mouth support from the growing network of distributors, installation contractors, OEMs, strategic partners and end-users that understand the benefits of our products.

As of December 31, 2017, we had 38 sales and marketing professionals worldwide. Their efforts were supported by a team of eight sales consultants.

## Our Customers and End-Users

### Customers

Our primary customers are distributors, installation contractors and OEMs that stock, install and fabricate insulation products, components and systems for technically sophisticated end-users that require high-performance insulation.

- **Distributors:** We currently operate through a global network of 69 insulation distributors. In general, insulation distributors stock, sell and distribute aerogel materials to insulation contractors and end-users. The distribution of our product outside the United States is often conducted under agreements that provide for exclusivity by geography linked to annual purchase volume minimums. These insulation distributors typically market, promote and advertise our aerogel materials across their market.
- **Contractors:** We currently sell directly to a number of insulation contractors under project specific contracts or general purchase orders. Insulation contractors generally perform insulation installation, inspection, maintenance and project management for end-users. In addition, some insulation contractors provide end-users with project engineering and design services.
- **OEMs:** We currently sell directly to a small network of OEMs that design, fabricate and manufacture insulation components and systems for use in the energy infrastructure, industrial, building materials, transportation, appliance and apparel markets.
- **Direct Sales to End-Users:** In certain instances, we sell directly to end-use customers in the energy infrastructure insulation market. In these instances, our end-use customer directly manages and controls specification, logistic, installation, inspection, maintenance and fabrication activities of our aerogel products.

Distribution International, Inc. and TechnipFMC plc represented 15% and 12%, respectively, of our total revenue for 2017 and were our only customers representing 10% or more of our revenue for that period.

Our product revenue is generated by sales to customers around the world. In 2017, 46% of our product revenue was generated in the United States, 32% in Asia-Pacific, 15% in Europe, 4% in Latin America, 2% in Canada, and less than 1% in the Middle East based on shipment destination.

A substantial portion of our sales are to shipment destinations located outside the United States, including Korea, India, Hong Kong, Norway, Brazil, Taiwan, Australia, Great Britain, Germany and the Netherlands based on our shipment destination. Total revenue generated from outside of the United States amounted to \$60.2 million or 54% of total revenue, \$82.0 million or 70% of total revenue and \$78.0 million or 64% of total revenue, in the years ended December 31, 2017, 2016 and 2015, respectively. In addition, we may expand our operations outside the United States. As a result, we are subject to a number of risks; see “Risk Factors — A substantial portion of our revenue comes from sales in foreign countries and we may expand our operations outside of the United States, which subjects us to increased economic, foreign exchange, operational and political risks that could increase our costs and make it difficult for us to operate profitably.”

### End-Users

The end-users of our aerogel blankets include some of the largest and most well capitalized companies in the world. Our products are installed in more than 40 countries worldwide.

### Energy Infrastructure

- **Oil Refining:** We believe we have had initial product deployments in more than 30% of the world’s 640 refineries. In addition, we believe our aerogel blankets are used by 24 of the world’s 25 largest refining companies including ExxonMobil, Shell and Chevron, among others. Over time, these companies have used our products in an increasing range of applications and throughout an increasing number of their facilities.
- **Petrochemical:** We believe our aerogel blankets are used by all of the world’s 20 largest petrochemical companies including Reliance Industries, Formosa Petrochemical, and LyondellBasell Industries, among others.
- **Natural Gas and LNG:** Our products are in use at facilities operated by PTT LNG, ExxonMobil, and Dominion Energy, among others.
- **Onshore:** Our aerogel blankets are in use in several Canadian oil sands facilities owned and operated by Suncor Energy, ConocoPhillips and Husky Energy, among others.

- **Offshore:** Our products are currently used in subsea projects off the coast of Brazil, in the Gulf of Mexico, in the North Sea, off the coast of Malaysia and off the west coast of Africa. Our products are installed in offshore projects owned by Total, Marathon Oil, ConocoPhillips and Shell, among others.
- **Power Generation:** We are targeting operators of gas, coal, nuclear, hydro and solar power generating facilities. Our products are currently used at facilities owned and operated by NextEra Energy Resources, among others.
- **District Energy:** Our products are used in medium- to high – temperature steam distribution networks in universities and municipalities within the United States and Asia.

### ***Building Materials and Other Markets***

Traditionally, we have relied on the efforts of a small network of partners, OEMs and fabrication houses to serve the building materials, transportation, apparel and appliance markets. These partners, OEMs and fabricators are manufacturers of components and systems for buildings, refrigerated and hot appliances, cold storage equipment, automobiles, aircraft, trains and electronic sectors and manufacturers of outdoor gear and apparel. In addition, we have partnered with BASF to develop and commercialize innovative products optimized to meet the needs of the building materials market. While our products have not yet been widely adopted in these markets, we expect that the end-users of our products in these markets will include a wide range of institutions, businesses, individuals, and government agencies.

### **Manufacturing**

We manufacture our products using our proprietary technology at our facility located in East Providence, Rhode Island. We have operated the East Providence facility since 2008 and have significantly increased manufacturing capacity and productivity during the period. Our manufacturing process is proven, scalable and can meet increasing demand.

Our manufacturing group is led by a seasoned team with management experience at global industrial and specialty chemical companies. Our manufacturing workforce is experienced and, to date, we have experienced employee turnover consistent with others in our industry. We have well-defined maintenance, environmental, health and safety programs and operating processes in place. We employ statistical processes and quality controls in our manufacturing systems. We measure and monitor thermal conductivity, hydrophobicity and other key properties of our aerogel blankets during the manufacturing process. We are ISO 9001:2015 certified.

We successfully commenced operation of our third production line at the East Providence facility in 2015, which increased our annual nameplate capacity to 50 million square feet of aerogel blankets. We have initiated a series of projects designed to increase the nameplate capacity of the East Providence facility by an additional 10 million square feet of aerogel blankets by the end of 2020 at a projected cost of between \$15 million and \$20 million. This series of projects is designed to improve manufacturing productivity and capital efficiency through a phased deployment of enhanced chemical and process technologies.

In addition, we have completed the design and engineering of a planned first production line in a second manufacturing facility to be constructed on a 43 acre site in Statesboro, Georgia. The site is served by rail and provides convenient access to local ports. State and local governmental authorities have agreed to provide us with a package of incentives including outright grants, free land, infrastructure support, tax credits and abatements, training programs and related benefits.

Based on our plans for the second facility, our projected cost to construct plant infrastructure and a first production line in two phases is between \$120 million and \$130 million. We currently expect the first line will increase our estimated annual nameplate capacity by 40 million square feet of aerogel blankets. The plant site, layout and design will support future development of two additional similar production lines. We have elected to delay construction of the Statesboro facility to better align the timing of this capacity expansion with our assessment of future demand.

We directly control all stages in the manufacture of our aerogel blankets. Our direct ownership of manufacturing operations allows us to maintain control of proprietary process technologies and to control product quality. Our production of aerogel blankets utilizes a continuous process and consists of the following key steps:

- **Sol Preparation.** Mixing of a silica precursor in ethanol, a catalyst and additives in set formulas to deliver the target properties of the resultant aerogel.
- **Casting.** Application of the sol into a fiber batting and initial formation of the gel structure.
- **Aging.** Bathing of the gel-saturated blankets in fluids to impart desired physical and thermal properties.
- **Extraction.** Supercritical extraction of the ethanol liquid from the gel-saturated blanket to produce an aerogel blanket.

- **Heat Treatment.** Drying to remove trace ethanol, salts and water from the aerogel blankets.
- **Finishing.** Coating to enhance quality and product handling.
- **Quality Control.** Utilizing statistical process and quality controls to measure thermal conductivity, hydrophobicity and other key properties of our aerogel blankets.

Our material costs were the equivalent of 45%, 41% and 45% of product revenue for the years ended December 31, 2017, 2016 and 2015, respectively. The materials used in the production of our products consist primarily of fiber battings, silica precursors and ethanol, which is used in the delivery of the silica precursors. Multiple sources of supply exist for all of our raw materials, and we believe the markets for these products are competitive and prices are relatively stable. We purchase silica precursors from several suppliers. Based on the current level of demand for our products, we believe that an adequate long-term supply of silica precursors is available. However, if demand for our products increases rapidly, we will need to work with suppliers to ensure that an adequate long-term supply of silica precursors will be available. Suppliers of silica precursors include industrial companies that produce it directly or that produce it as a byproduct of other industrial processes. We are working with a number of suppliers to plan for our potential future needs and to develop processes to reduce the long-term cost of the silica precursors used in our products. See “Risk Factors — Risks Related to Our Business and Strategy — Shortages of the raw materials used in the production of our products, increases in the cost of such materials or disruptions in our supply chain could adversely impact our financial condition and results of operations.”

We are seeking to lower our manufacturing costs and to improve the per square foot costs of our aerogel blankets by optimizing our formulations and manufacturing processes to improve yields, by obtaining material price reductions from existing vendors, by qualifying new vendors for certain materials and by optimizing shipping costs. In addition, we believe additional opportunities to realize production efficiencies and to reduce per unit overhead costs will arise with growth in the scale of our manufacturing operations. Our objective is both to reduce costs to enhance our competitive advantage and to ensure we deliver high quality finished products to our customers.

### **Research and Development**

The mission of our research and development team is to leverage our aerogel technology platform in support of our commercial objectives. In our existing markets, research and development personnel design new and improved insulation products to enhance our value to customers and to expand our revenue potential. Our materials scientists and engineers also seek to develop enhanced chemical and process technologies to improve yields, lower manufacturing costs and improve product performance. In new markets, research and development personnel seek to exploit the unique characteristics of aerogels, including low thermal conductivity, high surface area, high electrical conductivity, and tunable porosity, to develop aerogel enhanced products and next generation technology addressing complex and unmet market needs.

Our research and development expenditures were \$6.2 million, \$5.3 million and \$5.3 million for the years ended December 31, 2017, 2016 and 2015, respectively. In addition, we spent \$0.9 million, \$1.3 million and \$1.0 million for the years ended December 31, 2017, 2016 and 2015, respectively, on research and development activities sponsored by federal and other government agencies.

### **Contract Research and Government Support**

We regularly seek funding from a number of federal and other government agencies in support of our research and development and manufacturing activities. Research performed under contract to the Department of Defense, the Department of Energy and other institutions allows us to develop and leverage technologies into broader commercial applications. We also work closely with customers in government and industry to develop potential aerogel solutions that leverage not only the thermal insulation performance but other benefits of aerogels as well. The research and development activities that we conduct under such contracts may produce intellectual property to which we may not have ownership or exclusive rights and will be unable to protect or monetize.

Under our contracts, the U.S. government generally has the right not to exercise options to extend or expand our contracts and may modify, curtail or terminate the contracts at its convenience. Our government customers may not renew our existing contracts after the conclusion of their terms and we may not be able to enter into new contracts with U.S. government agencies. Any decision by the U.S. government not to exercise contract options or to modify, curtail or terminate our contracts or not to renew our contracts or enter into new contracts with us would adversely affect our revenues.

We have received \$53.7 million in funding under government contracts from inception through December 31, 2017. Our contract research revenue was \$2.0 million, \$2.2 million and \$2.0 million for the fiscal years ended December 31, 2017, 2016 and 2015, respectively.

## Intellectual Property

Our success depends in part upon our ability to obtain, maintain and enforce intellectual property rights that cover our aerogel technology platform, including, product forms, applications and/or manufacturing technologies and the technology or know-how that enables these product forms, applications, technologies and specifications, to avoid and defend against claims that we infringe the intellectual property rights of others, and to prevent the unauthorized use of our intellectual property. Since aerogels were developed more than 80 years ago, there has been a wide range of research, development and publication on aerogels and related technologies, which make it difficult to establish intellectual property rights to many key elements of aerogel technology and to obtain meaningful patent protection. Where appropriate, we seek to protect our rights by filing patent applications in United States and other key foreign jurisdictions related to products, processes, technology and improvements that we consider patentable and important to our business and, in particular, our aerogel technology, product forms and their applications in promising markets and our manufacturing technologies. We also rely on trade secrets, trademarks, licensing agreements, confidentiality and nondisclosure agreements and continuing technological innovation to safeguard our intellectual property rights and develop and maintain our competitive advantage.

As of December 31, 2017, we owned 39 issued U.S. patents, 23 pending U.S. patent applications (including three issued U.S. patents and one pending U.S. patent application that we co-own with third parties), 68 issued foreign patents and 71 pending foreign patent applications (including 18 issued foreign patents and three pending foreign patent applications that we co-own with third parties). The U.S. patents that we own are generally effective for 20 years from the filing date of the earliest application to which each U.S. patent claims priority. The scope and duration of each of our foreign patents varies in accordance with local law. Our early patents start to expire in December 2021.

In May, 2016, we filed a complaint for patent infringement against Nano Tech Co., Ltd., or Nano, and Guangdong Alison Hi-Tech., Ltd., or Alison and together with Nano, the Respondents, in the United States International Trade Commission, or the ITC. The ITC complaint alleged that these two China-based companies have engaged and are engaging in unfair trade practices by importing aerogel products in the United States that infringe, and/or are manufactured by processes that infringe, several of our patents in violation of Section 337 of the Tariff Act of 1930, or the Tariff Act. In the ITC complaint, we sought exclusion orders from the ITC that direct the United States Customs and Border Protection to stop the importation of these infringing products. In June 2016, the ITC instituted an investigation based on our complaint. In September 2017, the Administrative Law Judge (“ALJ”) presiding over the ITC investigation issued an Initial Determination finding that Alison and Nano have infringed three of our patents relating to aerogel insulation and/or methods of manufacturing aerogel insulation. As part of the Initial Determination, the ALJ found that Alison and Nano infringed all of the patent claims asserted against each of them across the three asserted patents, and that Alison and Nano failed to prove the asserted claims were invalid. The ALJ also recommended a limited exclusion order as a remedy to prevent the importation of infringing aerogel products into the United States. On February 5, 2018, the ITC issued its final determination confirming the ALJ’s infringement and validity determinations except with respect to one dependent product claim where the ITC found the claim not infringed. The ITC also revised some of the ALJ’s claim constructions. However, the ITC affirmed that Alison and Nano have each violated Section 337 of the Tariff Act and therefore issued a limited exclusion order prohibiting importation of infringing aerogel insulation products manufactured by Alison and Nano. The exclusion order, which will be enforced by United States Customs and Border Protection, is subject to a 60-day presidential review period, but is otherwise expected to be in full effect starting on April 6, 2018. Upon a request by a party, the final determination may be appealed to the United States Court of Appeals for the Federal Circuit. In addition to Respondents’ contention at the ITC that the asserted patents were invalid, Alison also filed petitions with United States Patent and Trademark Office, or USPTO, requesting Inter-Partes Review to cancel certain claims in three of Aspen’s manufacturing process patents and one product patent. A three member panel of Administrative Patent Judges at the USPTO denied all of Alison’s petitions to institute Inter-Partes Review challenging the validity of these Aspen patents. Alison has also filed similar requests with the Chinese Patent Office, or SIPO, seeking to invalidate two of our Chinese manufacturing process patents and two of our Chinese product patents. After the conclusion of the oral proceedings and before any decision issued by the SIPO, Alison withdrew all of its requests for invalidation of our Chinese patents.

In April 2016, we filed a patent infringement suit at the District Court in Mannheim, Germany against the Respondents and two European resellers asserting their infringement of one of our German patents. We subsequently asserted infringement of another three patents against Nano and a European reseller of Alison’s products at the Mannheim court. In 2016, we settled with one of the European resellers in exchange for a commitment not to procure infringing products and cooperation with our case. In January 2018, the court issued a series of judgments by acknowledgement (German, “Anerkenntnisurteil”) finding the second reseller, Hiltex Technische Weefsels b.v., or Hiltex, liable for infringement and issued injunctions against Hiltex preventing its resale of infringing Chinese aerogels. The judgments resulted from a settlement agreement whereby Hiltex agreed not to resell infringing products in Europe where at least one of the asserted patents is active. The litigation against the other defendants is ongoing. Nano has also initiated a nullity action in German Federal Patent Court against one of our asserted German manufacturing process patents. Alison likewise filed an opposition to one of the asserted patents at the European Patent Office, or EPO, and also initiated nullity actions against two other patents. Nano also filed an opposition against the same patent at the EPO.

Due to their nature, it is difficult to predict the outcome or the costs involved in any litigation. Furthermore, the Respondents may have significant resources and interest to litigate and therefore, these litigation matters could be protracted and may ultimately involve significant legal expenses. We have incurred approximately \$7.3 million of expenses related to this litigation through December 31, 2017. In addition to the foregoing, we have been and may be from time to time party to other legal proceedings that arise in the ordinary course of business and to other patent enforcement actions to assert our patent rights.

We believe that having distinctive names is an important factor in marketing our products, and therefore we use trademarks to brand some of our products, including Pyrogel, Cryogel and Spaceloft. As of December 31, 2017, we had five trademark registrations in the United States and 48 trademark registrations in foreign jurisdictions, including the European Union, Japan, China, Canada, South Korea and Brazil. Although we have a foreign trademark registration program for selected marks, our approach may not be comprehensive enough or we may not be able to register or use such marks in each foreign country in which we seek registration.

### ***Cross License Agreement with Cabot Corporation***

In April 2006, we entered into a cross license agreement with Cabot Corporation, as amended in September 2007, in which each party granted certain intellectual property rights to the other party. The cross license agreement remains in effect until the expiration of the last to expire of the issued patents or patent applications and acquired patents licensed thereunder. We hold a non-exclusive, worldwide license to those patents and patent applications owned or licensed by Cabot that are necessary for us to (i) practice our manufacturing technology within a field of use, which is defined in accordance with the specific chemistry of our aerogel products and the supercritical fluid technology that we use in our manufacturing technology and (ii) use and sell the resulting aerogel blanket and derivative products. We paid Cabot \$38 million over a period of approximately seven years, with the last payment made in March 2013, in connection with this license agreement. We have granted to Cabot a reciprocal, non-exclusive, worldwide license to certain patents and patent applications that we own that are necessary for Cabot to practice its processes within a field of use defined in accordance with the specific chemistry in its aerogel products and the drying technology that it uses to manufacture its products. The grant of license to each party covers issued patents, patent applications and patents issued from such counterpart applications, as well as patents licensed or acquired during a specified period, in each case that claim aerogels, or methods, materials of manufacture, or uses of aerogels.

### **Our Company**

We are a corporation organized under the laws of Delaware. In June 2008, we completed a reorganization pursuant to which our predecessor company merged with and into a newly formed Delaware corporation, renamed Aspen Aerogels, Inc. We own three wholly owned subsidiaries: Aspen Aerogels Rhode Island, LLC, Aspen Aerogels Germany, GmbH and Aspen Aerogels Georgia, LLC, which was formed in August 2016. We maintain our corporate offices in Northborough, Massachusetts.

On June 18, 2014, we completed our initial public offering, or IPO, of 7,500,000 shares of our common stock at a public offering price of \$11.00 per share. As of February 27, 2018, we had 23,643,189 shares of our common stock outstanding.

We are required to file annual, quarterly and current reports, proxy statements and other information required by the Securities Exchange Act of 1934, as amended, or the Exchange Act, with the Securities and Exchange Commission, or the SEC. You may read and copy the reports and other information we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. You may also obtain copies of this information by mail from the public reference section of the SEC, 100 F Street, N.E., Washington, D.C. 20549, at prescribed rates. You may obtain information regarding the operation of the public reference room by calling 1-800-SEC-0330. The SEC also maintains a website that contains reports, proxy statements and other information about issuers, like us, who file electronically with the SEC. The address of that website is <http://www.sec.gov>.

We maintain a public website at <http://www.aerogel.com> and use our website as a means of disclosing material non-public information and for complying with our disclosure obligations under Regulation FD. Our website includes an Investors section through which we make available, free of charge, our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, Proxy Statements and Forms 3, 4 and 5 filed on behalf of directors and executive officers, as well as any amendments to those reports filed or furnished pursuant to the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. We also make available on our website the charters for our Board of Directors' Audit Committee, Compensation and Leadership Development Committee and Nominating and Corporate Governance Committee, as well as our Code of Business Conduct and Ethics, our Corporate Governance Guidelines and other related materials. The information on our website is not part of this annual report.

Our Investor Relations Department can be contacted at Aspen Aerogels, Inc., 30 Forbes Road, Building B, Northborough, MA 01532, Attention: Investor Relations; telephone: 508-691-1111; e-mail: [ir@aerogel.com](mailto:ir@aerogel.com).

## Employees

As of December 31, 2017, we had 263 full-time employees and one part-time employee, with 29 in research and development, 172 in manufacturing operations and supply chain, 38 in sales and marketing and 24 in general and administrative functions. Of our employees, 251 are located in the United States and twelve are located abroad. We consider our current relationship with our employees to be of good standing. None of our employees are represented by labor unions or have collective bargaining agreements.

## Seasonality

Our industry and product offering makes us less susceptible to seasonal patterns as our operating results are generated in part by demand for insulation associated with new-build construction of facilities, capital expansions and related capital projects, and larger maintenance-related projects in the energy infrastructure market. Historically, our second and fourth quarter results have shown increased levels of revenue, which we believe is associated with our end-use customers' maintenance schedules and timing of capital projects.

## Environmental Matters

We are subject to federal, state, local and foreign laws and regulations designed to protect the environment and to regulate the discharge of materials into the environment. We believe that our policies, practices, and procedures are properly designed to prevent unreasonable risk of environmental damage and associated financial liability. To date, environmental control regulations have not had a significant adverse effect on our overall operations. See "Risk Factors — We may incur significant costs complying with environmental, health and safety laws and related claims, and failure to comply with these laws and regulations could expose us to significant liabilities, which could adversely affect our results of operations."

## **Item 1A. RISK FACTORS**

### **Risks Related to Our Business and Strategy**

***We have incurred annual net losses since our inception, and we may continue to incur net losses in the future and may never reach profitability.***

We have a history of losses, and we may not ever achieve full year profitability. We experienced net losses of \$19.3 million, \$12.0 million and \$6.4 million for the years ended December 31, 2017, 2016 and 2015, respectively. As of December 31, 2017, our accumulated deficit was \$437.1 million. We expect to continue to incur operating losses as a result of expenses associated with the continued development and expansion of our business. Our expenses include research and development, sales and marketing, and general and administrative costs. Furthermore, these expenses are not the only factors that may contribute to our net losses. For example, interest expense on any future financing arrangements that we incur could contribute to our net losses. Any failure to increase revenue or manage our cost structure as we implement initiatives to grow our business could prevent us from achieving profitability, or sustaining profitability if we do achieve it. In addition, our ability to achieve profitability is subject to a number of risks and uncertainties discussed below, many of which are beyond our control. Failure to become and remain profitable may adversely affect the market price of our common stock and our ability to raise capital and continue operations.

***We have yet to achieve positive total cash flow, and our ability to generate positive cash flow is uncertain.***

To develop and expand our business, we have made significant up-front investments in our manufacturing capacity and incurred research and development, sales and marketing and general and administrative expenses. In addition, our growth has required a significant investment in working capital. We experienced negative cash flows from operating activities of \$4.6 million and \$0.6 million for the year ended December 31, 2017 and 2016, respectively, and positive cash flows from operating activities of \$5.4 million for the year ended December 31, 2015. The cumulative cash flows from operating activities during the three year period were insufficient to offset cash flows used in investing activities principally to expand our manufacturing capacity during the same time period. As a result, we experienced negative total cash flows during the three year period.

We expect that for the foreseeable future our total cash flow will remain negative. In particular, we will need cash to fund our significant planned future capital expenditures to expand manufacturing capacity in our East Providence, Rhode Island manufacturing facility and with the planned construction of our second manufacturing plant. We will also require significant amounts of working capital to support our growth and we will need to increase our inventories of raw materials and our products as we seek to grow our business. In addition, to the extent we incur long-term debt, we may have debt maturities from time to time that will require cash in order to repay those obligations. We may not achieve sufficient revenue growth to generate positive future cash flow and, therefore,

we may need to raise additional capital from investors to achieve our expected growth. An inability to generate positive cash flow for the foreseeable future or raise additional capital on reasonable terms, if at all, may decrease our long-term viability.

***We are dependent on a single manufacturing facility. Any significant disruption to this facility or the failure of any one of our three production lines in this facility to operate according to our expectation could have a material adverse effect on our business and results of operations.***

We have three production lines in a single manufacturing facility located in East Providence, Rhode Island. Our ability to meet the demands of our customers depends on efficient, proper and uninterrupted operations at this manufacturing facility. In the event of a significant disruption to our sole manufacturing facility or breakdown of any of the production lines, we currently do not expect that we would have sufficient inventory in stock to meet demand until the production lines return to operation.

Power failures or disruptions, the breakdown, failure or substandard performance of equipment, or the damage or destruction of buildings and other facilities due to fire or natural disasters could severely affect our ability to continue our operations. In the event of such disruptions, we are unlikely to find suitable alternatives or may not be able to make needed repairs on a timely basis and at reasonable cost, which could have a material adverse effect on our business and results of operations. In particular, our manufacturing processes include the use of high pressures, high temperatures and flammable chemicals, which subjects us to a significant risk of loss resulting from fire, spill or related event. We had occasional incidences of fires at our initial facility in Northborough, Massachusetts that preceded our current manufacturing facility in East Providence, Rhode Island.

If our manufacturing facility or any equipment therein were to be damaged or cease operations, it may reduce revenue, cause us to lose customers and otherwise adversely affect our business. The insurance policies we maintain to cover losses caused by fire or natural disaster, including business interruption insurance, may not adequately compensate us for any such losses and will not address a loss of customers that we expect would result. If our existing manufacturing facility was damaged or destroyed we would be unable to operate our business for an extended period of time and our business and results of operations may be materially adversely affected, potentially even threatening our viability.

***If the expected growth in the demand for our products does not follow after each of our planned capacity expansions, then our business will be materially adversely affected.***

Our long-term growth plan requires that we continue to increase our production capacity. As we pursue our capacity expansion plans, we will incur significant capital expenditures and increased levels of manufacturing expenses in anticipation of expected growth in demand for our products. In particular, we expect that these substantial additional expenditures will be made by us significantly in advance of the existence of the level of demand that would ensure the most efficient use of our planned new capacity. As a result, if the expected growth in demand for our products fails to materialize within a reasonable amount of time following each of our planned capacity expansions, whether because of low oil and gas prices, the loss of a significant customer, the failure to develop new markets or for any other reason, then we would suffer decreased levels of cash flow and our financial condition and results of operations would be adversely affected.

***If we fail to achieve the increase in production capacity that our long-term growth requires in a timely manner, or at all, our growth may be hindered and our business or results of operations may be materially adversely affected.***

If, for any reason, including our inability to obtain financing, our planned expansion of capacity in our existing East Providence, Rhode Island facility or in our planned second manufacturing facility to be constructed in Statesboro, Georgia should fail to be completed in a timely manner, or at all, or any of the production lines in our existing or future manufacturing facilities do not operate according to our expectations, sales and or profitability may be impeded, our growth may be hindered and our business or results of operations may be materially adversely affected.

Many factors could delay, impede or prevent the expansion of our existing manufacturing facility or construction and operation of a second manufacturing facility or cause us to reduce the scale or scope of the expansion projects, including:

- our inability to obtain financing on favorable terms, or at all;
- design, engineering and construction difficulties or delays;
- our failure or delay in obtaining necessary legal, regulatory and other approvals;
- interruptions in the supply of the necessary equipment, or construction materials or labor or an increase in their respective prices;



- opposition of local interests; and
- natural disasters, accidents, political unrest or unforeseen events.

Many factors could prevent our existing and future manufacturing facilities from producing at expected, projected or targeted nameplate capacities or could cause us to reduce the scale or scope of future capacity expansions or facilities, including:

- design and engineering failures;
- inability to retain, manage and train a skilled workforce;
- the challenges of operating technically advanced or higher volume equipment than currently employed at our current facility in East Providence, Rhode Island;
- improper operation of the manufacturing equipment;
- decreases in our manufacturing yields due to the inefficient use of the materials needed to make our products in our manufacturing process;
- the availability of raw materials to support the levels of production that we anticipate at these facilities;
- strikes or labor disputes; and
- damage to the manufacturing equipment due to design and engineering flaws, construction difficulties or operator error.

Any such capacity expansion will place a significant strain on our senior management team and our financial and other resources. The costs associated with and the resources necessary for our capacity expansion plans could exceed our expectations and result in a materially adverse impact on our business, results of operations, financial condition and cash flows.

If we are unable to complete the projects as contemplated, the costs incurred in connection with such projects may not be recoverable. For example, during 2013, we redesigned and reduced the planned scale of the third production line in our East Providence, Rhode Island facility. We recorded an associated \$3.4 million impairment charge during 2013 related to the write-off of construction in progress assets. As of December 31, 2017, we have capitalized approximately \$7.2 million related to engineering designs and other pre-construction costs related to our planned second manufacturing facility in Statesboro, Georgia. A redesign of, change in scale of, or failure to complete the construction of second manufacturing facility and other similar impairments of our assets in the future could result in a materially adverse impact on our business, results of operations, and financial condition.

***We will require significant additional capital to pursue our growth strategy, but we may not be able to obtain additional financing on acceptable terms or at all.***

The growth of our business will depend on substantial amounts of additional capital for expansion of existing production lines or construction of new production lines or facilities, for ongoing operating expenses, for continued development of our aerogel technology platform, or for introduction of new product lines. Our capital requirements will depend on many factors, including the rate of our revenue growth, our introduction of new products, our enhancements to existing products, and our expansion of sales and marketing and product development activities. In particular, our plans to expand our existing facility in East Providence, Rhode Island and to construct a planned second manufacturing facility in Statesboro, Georgia are dependent on our ability to raise debt and potentially issue equity. There is no assurance that we will be able obtain any such type of financing on terms acceptable to us or at all.

In addition, we may consider strategic acquisitions of complementary businesses or technologies to grow our business, which would require significant capital and could increase our capital requirements related to future operation of the acquired business or technology.

We may not be able to obtain loans or raise additional capital on acceptable terms or at all. Our loan and security agreement with Silicon Valley Bank, under which we have the ability to borrow up to \$20.0 million, contains restrictions on our ability to incur additional indebtedness, which, if not waived, could prevent us from obtaining needed capital. In addition, our revolving credit facility with Silicon Valley Bank will mature on April 28, 2018. Any future credit facilities or debt instruments would likely contain similar restrictions. We may not be able to obtain bank credit arrangements or effect an equity or debt financing on terms acceptable to us or at all in order to fund our future capacity expansion plans. A failure to obtain additional financing when needed could adversely affect our ability to maintain and grow our business.

***A sustained downturn in the energy industry, due to lower oil and gas prices or reduced energy demand, could decrease demand for some or all of our products and services, which could have a material adverse effect on our business, financial condition and results of operations.***

Demand for a significant portion of our products and services depends on the level of capital expenditure by companies in the energy industry, which depends, in part, on current and expected energy prices. Prices of oil and gas have been highly volatile in the past several years with oil prices reaching a high above \$100 per barrel in mid-2014 to a low below \$30 per barrel in early 2016. The volatility in oil prices and declines in oil prices have resulted, from time to time, in a reduction in capital expenditures by many companies in the energy industry, and in particular by end-users of our products involved in the construction and expansion of offshore and onshore oil and gas production facilities. Sustained lower energy prices may also reduce our end-users' need to improve energy savings by using premium-priced insulation products like ours, thus reducing demand for our products and causing downward pressure on the pricing of our products. A sustained downturn in the capital expenditures of our customers, whether due to periods of lower energy prices or a further decrease in the market price of oil and gas or otherwise, and including the perception that such a downturn might occur or continue, may delay capital projects, decrease demand for our products and cause downward pressure on the prices we charge for our products, which, in turn, could have a material adverse effect on our business, financial condition and results of operations. Such downturns, including the perception that they might occur or continue, could have a significant negative impact on the market price of our common stock.

***The markets we serve are subject to general economic conditions and cyclical demand, which could harm our business and lead to significant shifts in our results of operations from quarter to quarter that make it difficult to project long-term performance.***

Our results of operations have been, and may in the future be, adversely affected by general economic conditions and the cyclical pattern of certain industries in which our customers and end-users operate. Demand for our products and services depends in large part upon the level of capital and maintenance expenditures by many of our customers and end-users, in particular those in the energy, petrochemical and power generation industries, and firms that design, construct and operate facilities for these industries.

These customers' expenditures historically have been cyclical in nature and vulnerable to economic downturns. In particular, profitability in the energy industry is highly sensitive to supply and demand cycles and commodity prices, which historically have been volatile; and our customers in this industry historically have tended to delay large capital projects, including expensive maintenance and upgrades, during industry downturns. Delays in customer projects may cause fluctuations in the timing or the amount of revenue earned and our results of operations in a particular period. Prolonged periods of little or no economic growth could decrease demand for oil and gas which, in turn, could result in lower demand for our products and a negative impact on our results of operations and cash flows. In addition, this historically cyclical demand and potential customer project delays may lead to significant shifts in our results of operations from quarter to quarter, which limits our ability to make accurate long-term predictions about our future performance. We estimate that sales to end-use customers in the energy industry accounted for approximately 95% of our 2017 revenues and we expect that they will continue to account for a significant portion of our future revenues.

***If we fail to meet required project, investment and job requirement goals for the second manufacturing facility in a timely fashion, the package of incentives offered by governmental entities may be terminated or we may be required to repay the value of incentives received from governmental entities, which could have a material adverse impact on our financial condition and results of operations.***

We have been offered incentives by the State of Georgia, Bulloch County Development Authority and the City of Statesboro to locate and operate our planned second manufacturing facility in Statesboro, Georgia. These incentives include a cash grant, income and withholding tax credits, training assistance, the gift of a 43 acre site, a 10 year property tax abatement, infrastructure improvements, reduced fees, site preparation services, and temporary office space. If we do not commence construction of the second manufacturing facility by February 15, 2019, the governmental entities may terminate the agreement under which the incentives are to be provided. There can be no assurance that we will be able to commence construction prior to that date or that the parties to the agreement will agree to extend such date. In addition, if we do not achieve specific investment and job creation goals at the Statesboro, Georgia site by 2021, and maintain such levels for a period of seven years thereafter, we will be required to repay the value of any incentives received to the governmental entities, which could adversely impact our financial condition and results of operations.

We have elected to delay the second manufacturing facility to better align the timing of this capacity expansion with our assessment of future demand. As a result, we have not yet incurred an obligation to repay any incentives that may be provided by the government entities.

***Growth has placed significant demands on our management systems and our infrastructure. If we fail to manage our long-term growth effectively, we may be unable to execute our business plan, address competitive challenges and meet applicable product specifications and technical and delivery requirements.***

We may be unable to manage our growth. To manage our anticipated future growth, we must continue to:

- improve and expand our manufacturing, sales and marketing, and engineering organizations,
- enhance our research and development capabilities and resources,
- improve regulatory compliance, financial control and reporting systems;
- expand our manufacturing and distribution facilities and capacity; and
- recruit, train and retain additional qualified personnel to enhance our managerial capabilities.

All of these measures will require significant expenditures and will demand the attention of management. At certain points in the past, significant growth in demand for our products has put our management and operating systems under strain. In addition, the physical expansion of our operations may lead to significant costs and may divert our management and business development resources. Furthermore, we compete for personnel and advisors with other companies and other organizations, many of which are larger and have greater name recognition and financial and other resources than we do. Due to our limited resources, we may not be able to effectively manage the expansion of our operations or adequately recruit, train and retain qualified personnel. Any inability to manage growth could result in a loss of existing customers and revenues, delays in the execution of our business plans, and disruption of our operations. If we fail to achieve the necessary level of efficiency in our organization as it grows, it could have a material adverse impact on our business, results of operations and financial conditions.

We allocate our manufacturing operations, sales and marketing, research and development, general and administrative and financial resources based on our business plan, which includes assumptions about current and future orders and revenues from customers. However, the factors involved in such projections are uncertain. If our assumptions regarding these factors prove to be incorrect or if competing products gain further market share, then actual demand for our aerogel products could be significantly less than the demand we anticipate and we may not be able to grow our revenue or achieve profitability.

***Shortages of the raw materials used in the production of our products, increases in the cost of such materials or disruptions in our supply chain could have a material adverse impact on our financial condition and results of operations.***

The raw materials used in the production of our products consist primarily of fiber battings, silica precursors and additives. In addition, the production process requires the use of process gases and other materials typical to the chemical processing industry, as well as access to electricity, natural gas, water and other basic utilities. Although we are not dependent on a single supplier, we are dependent on the ability of our third-party suppliers to supply such materials on a timely and consistent basis. While these materials and utilities are available from numerous sources, they may be subject to fluctuations in availability and price.

Our third-party suppliers may not dedicate sufficient resources to meet our scheduled delivery requirements or our suppliers may not have sufficient resources to satisfy our requirements during any period of sustained or growing demand. Failure of suppliers to supply, delays in supplying or disruptions in the supply chain for our raw materials, or adverse allocations in the supply of certain high demand raw materials could materially adversely affect the results of our operations. Supply disruptions may affect our ability to meet our delivery schedules on a timely basis and materially negatively impact our results of operations. For example, in September 2015, pursuant to a force majeure notification, our primary carbon dioxide gas supplier temporarily curtailed supply of carbon dioxide to us due to a feedstock issue impacting the northeastern United States. During this period, the supply disruption required that we intermittently idle a portion of our manufacturing equipment thereby reducing our production volume.

Most of our raw materials are procured through individual purchase orders or short-term contracts and not through long-term contracts that ensure a fixed price or guaranteed supply for an extended period of time. This procurement strategy may not support sustained long-term supply chain stability. Fluctuations in the prices of these raw materials could have a material adverse effect on our results of operations. Our ability to pass increases in raw material prices on to our customers is limited due to competitive pricing pressure and the time lag between increased costs and implementation of related price increases.

In particular, we purchase a variety of silica precursors from several suppliers, mostly pursuant to individual purchase orders or short-term contracts and not pursuant to long-term contracts. We do not have a secure, long-term supply of silica precursors. We may not be able to establish arrangements for secure, long-term silica precursor supplies at prices consistent with our current costs or may incur a delay in supply while we seek alternative sources. In addition, fluctuations in ethanol prices may affect the cost of silica precursors. Any inability to continue to purchase silica precursors without long-term agreements in place, or to otherwise establish a

long-term supply of silica precursors at prices consistent with our current costs, would have a material adverse effect on our ability to increase our sales and achieve profitability.

***From time to time we have had difficulty in consistently producing products that meet applicable product specifications and technical and delivery requirements, and such difficulties could expose us to financial, contractual or other liabilities.***

Our insulation products are technologically advanced and require a precise and complex manufacturing process. Because of the precision and complexity of this manufacturing process and the high-performance characteristics of our products, from time to time we have had difficulty in consistently producing products that meet applicable specifications and technical and delivery requirements, including, our customers' and the end-users' specifications and requirements. At certain times in the past, the growth in demand for our products has contributed to this difficulty by putting significant pressure on our management, our personnel and our production facilities. See "Risk Factors — Growth has placed significant demands on our management systems and our infrastructure. If we fail to manage our long-term growth effectively, we may be unable to execute our business plan, address competitive challenges and meet applicable product specifications and technical and delivery requirements."

Any failure to meet these product specifications or technical and delivery requirements could result in the termination of existing customer contracts or purchase orders, the elimination or reduction of future purchase orders, the impairment of customer relationships, and the incurrence of financial, contractual or other liabilities. Products that do not meet these specifications or requirements may also expose us to warranty and product liability claims and associated adverse publicity. Any such termination, reduction, impairment, liability or publicity could result in a broader loss of existing customers and revenues and delay the execution of our business plans, disrupt our operations and could have a material adverse effect on our results of operations and financial condition.

***The market for insulation products incorporating aerogel blankets is relatively undeveloped and our products may never be widely adopted, which would have a material adverse effect on our business.***

The market for insulation products utilizing aerogel blankets is relatively undeveloped. Accordingly, our future results of operations will depend in large part on our ability to gain market share of the global energy infrastructure insulation market. Our ability to gain market share in this market is highly dependent on the acceptance of our products by large, well-established end-users, distributors, contractors and OEMs. The insulation market has historically been slow to adopt new technologies and products. Most insulation types currently in use in these markets have been in use for over 50 years. In addition, there is a tendency of end-users in some of our markets to opt for the lower short-term costs associated with traditional insulation materials. If we fail to successfully educate existing and potential end-users, distributors, contractors and OEMs regarding the benefits and value of our aerogel products, or if existing users of our products no longer rely on aerogel insulation for their insulation needs, our ability to sell our products and grow our revenue could be limited.

Our business strategy also includes the development of next generation products with the performance characteristics and price points required by markets outside the energy infrastructure market, including the building materials market. In the event that we are unable to develop products that meet market needs, we may be unable to successfully penetrate such markets. In addition, the innovative product development process requires the dedication of significant human, technical and financial resources, with no certainty of success or recovery of our related expenses. As a result, we may be unable to grow our business in markets outside of the energy infrastructure market, which could adversely affect the demand for our products.

Because we are often a new supplier to our end-use customers, we also may face concerns from these end-use customers about our reliability and our ability to produce our products in a volume sufficient to meet their supply needs. As a result, we may experience a reluctance or unwillingness by existing end-use customers to expand their use of our products and by potential end-use customers to begin using our products. Our products may never reach mass adoption, and changes or advances in technologies could adversely affect the demand for our products.

A failure to increase, or a decrease in, demand for aerogel insulation products caused by lack of end-user, market or distribution channel acceptance, technological challenges or competing technologies and products would result in a lower revenue growth rate or decreased revenue, either of which could have a material adverse effect on our business and our results of operations.

***Our products are expensive relative to other insulation products, which could make it more difficult for us to grow our revenue and achieve broader adoption of our aerogel products.***

While we believe our products have superior performance attributes and may sometimes have the lowest cost on a fully-installed basis or offer life-cycle cost savings, our competitors offer many traditional insulation products that are priced below our products. Our products are expensive relative to other insulation products and end-use customers may not value our products' performance

attributes sufficiently to pay their premium price. This could make it more difficult for us to grow our revenue and achieve broader adoption of our aerogel products. In addition, some of the benefits of our products are based on reduced installation time and related labor expense. In regions where labor costs are significantly lower than in the United States and Europe, the cost benefits of reduced installation times may not be adequate to overcome the relatively high price of our products and may make it more difficult for us to grow our revenue in those regions.

***The insulation market we serve is highly competitive; if we are unable to compete successfully, we may not be able to increase or maintain our market share and revenues.***

We face strong competition primarily from established manufacturers of traditional insulation materials. Large producers of traditional insulation materials, such as Johns Mansville, Saint-Gobain, Knauf Gips, Owens Corning and Rockwool, dominate the insulation market. In addition, we face increasing competition from other companies seeking to develop high-performance insulation materials, including aerogel insulation. For example, Cabot Corporation manufactures, markets and sells a different form of aerogel insulation that is competitive with our products, particularly in the offshore oil and gas sector for use in pipe-in-pipe applications. In addition, we are aware of competitors in China, including Guangdong Alison Hi-Tech Co, Ltd and Nano Tech Co, Ltd, which manufacture and market aerogel insulation products in blanket form. Many of our competitors are substantially larger and better capitalized than we are and possess greater financial resources. Our competitors could focus their substantial financial resources to develop new or additional competing products or develop products that are more attractive to potential customers than the products that we offer. We expect to face an increasing amount of competition in the aerogel insulation market over the next several years as existing competitors and new entrants seek to develop and market their own aerogel products.

Because some insulation manufacturers are substantially larger and better capitalized than we are, they may have the ability to sell their products at substantially lower costs to a large, existing customer base. Our products are expensive relative to other insulation products and end-use customers may not value our products' superior performance attributes sufficiently to pay their premium price. In addition, from time to time we may increase the prices for our products and these price increases may not be accepted by our end-use customers and could result in a decreased demand for our products. Similarly, we may make changes to our products in order to respond to customer demand or to improve their performance attributes and these changes may not be accepted by our end-use customers and could result in a decrease in demand for our products. These competitive factors could:

- make it more difficult for us to attract and retain customers;
- cause us to slow the rate of increase of our prices, delay or cancel planned price increases, lower our prices or discount our prices in order to compete; and
- reduce our market share and revenues.

Any of these outcomes could have a material adverse effect on our results of operations, financial condition and cash flows.

***A substantial portion of our revenue comes from sales in foreign countries and we may expand our operations outside of the United States, which subjects us to increased economic, trade, foreign exchange, operational and political risks that could materially adversely impact our business, financial conditions and results of operations and also increase our costs and make it difficult for us to operate profitably.***

A substantial portion of our sales are to shipment destinations outside the United States, including Korea, India, Hong Kong, Norway, Brazil, Taiwan, Australia, Great Britain, Germany and the Netherlands. Total revenue generated from outside of the United States, based on our shipment destination, amounted to \$60.2 million or 54% of total revenue, \$82.0 million or 70% of total revenue and \$78.0 million or 64% of total revenue, for the years ended December 31, 2017, 2016 and 2015, respectively. As a result, we are subject to a number of risks, including, but not limited to:

- the effect of applicable U.S. and foreign tax structures, including tax rates that may be higher than tax rates in the United States or taxes that may be duplicative of those imposed in the United States;
- trade relations among the United States and those foreign countries in which our customers and suppliers have operations, including protectionist measures such as tariffs and import or export licensing requirements, whether imposed by the United States or such foreign countries;
- general economic and political conditions in each country, which may interfere with, among other things, our supply chain, our customers and all of our activities in a particular location;
- difficulty in the enforcement of contractual obligations in non-U.S. jurisdictions and the collection of accounts receivable from foreign accounts;

- different regulatory regimes in the various countries in which we operate or sell our products;
- inadequate intellectual property protection in foreign countries;
- the difficulties and increased expense in complying with multiple and potentially conflicting domestic and foreign laws, regulations, product approvals and trade standards, including the U.S. Foreign Corrupt Practices Act and similar anti-bribery laws in non-U.S. jurisdictions, as well as the rules and regulations of the U.S. Office of Foreign Assets Control and similar sanctions laws;
- foreign currency exchange controls, restrictions and fluctuations, which could result in reduced revenue and increased operating expense;
- transportation delays or interruptions;
- labor rules and collective bargaining arrangements in foreign jurisdictions;
- difficulty in staffing and managing (including ensuring compliance with internal policies and controls) geographically widespread operations; and
- terrorist activity and political unrest, particularly given the use of our products at energy facilities.

In addition, sales of our products are generally conducted in U.S. dollars and we also bid for foreign projects in U.S. dollars. The strengthening of the U.S. dollar against the local currencies in the countries into which we sell our products may result in our products becoming more expensive relative to competing insulation products priced in the local currency. If the U.S. dollar strengthens, our sales into foreign countries with relatively weaker currencies may be adversely impacted and we may be less competitive in bidding for projects in those markets.

Our success will depend in large part on our ability to manage the effects of continued global political and economic uncertainty, especially in our international markets.

***Because of our significant international operations, we could be materially adversely affected by violations of the U.S. Foreign Corrupt Practices Act and similar anti-corruption, anti-bribery and anti-kickback laws.***

We operate on a global basis, with 54% of our product sales in 2017 being made to destinations outside the United States, including Canada, Mexico, Europe, Asia, South America and the Middle East. Our business operations and sales in countries outside the United States are subject to anti-corruption, anti-bribery and anti-kickback laws and regulations, including restrictions imposed by the Foreign Corrupt Practices Act, or FCPA, as well as the United Kingdom Bribery Act of 2010, or UK Bribery Act. The FCPA, UK Bribery Act, and similar anti-corruption, anti-bribery and anti-kickback laws in other jurisdictions generally prohibit companies, their intermediaries and their agents from making improper payments to government officials or any other persons for the purpose of obtaining or retaining business. We operate and sell our products in many parts of the world that have experienced governmental corruption to some degree and, in certain circumstances, strict compliance with anti-corruption, anti-bribery and anti-kickback laws may conflict with local customs and practices. We train our employees concerning anti-corruption, anti-bribery and anti-kickback laws and have policies in place that prohibit employees from making improper payments. We continue to implement internal controls and procedures designed to ensure that we comply with anti-corruption, anti-bribery and anti-kickback laws, rules and regulations and mitigate and protect against corruption risks. We cannot provide assurance that our internal controls and procedures will protect us from reckless, criminal or other acts committed by our employees or third-parties with whom we work. If we are found to be liable for violations of the FCPA or similar anti-corruption, anti-bribery and anti-kickback laws in international jurisdictions, either due to our own acts or out of inadvertence, or due to the acts or inadvertence of others, we could suffer criminal or civil fines or penalties or other repercussions, including reputational harm, which could have a material adverse effect on our business, results of operations and financial condition.

***A failure to comply with export control or economic sanctions laws and regulations could have a material adverse impact on our business, results of operations or financial condition. We may be unable to ensure that our distributors comply with applicable sanctions and export control laws.***

We operate on a global basis, with 54% of our product sales in 2017 being made to destinations outside the United States, including Canada, Mexico, Europe, Asia, South America and the Middle East. We face several risks inherent in conducting business internationally, including compliance with applicable economic sanctions laws and regulations, such as laws and regulations administered by the United States Department of Treasury's Office of Foreign Assets Control, or OFAC, the United States Department of State and the United States Department of Commerce. We must also comply with all applicable export control laws and regulations of the United States and other countries. Violations of these laws or regulations could result in significant additional

sanctions including criminal or civil fines or penalties, more onerous compliance requirements, more extensive debarments from export privileges or loss of authorizations needed to conduct aspects of our international business.

In certain countries, we may engage third party agents or intermediaries, such as customs agents, to act on our behalf and if these third party agents or intermediaries violate applicable laws, their actions may result in criminal or civil fines or penalties or other sanctions being assessed against us. We take certain measures designed to ensure our compliance with U.S. export and economic sanctions law and we believe that we have never sold our products to Iran, Cuba, Sudan or Syria through third party agents or intermediaries or made any effort to attract business from any of these countries. However, it is possible that some of our products were sold or will be sold to distributors or other parties that, without our knowledge or consent, re-exported or will re-export such products to these countries. Although none of our non-U.S. distributors are located in, or to our knowledge, conduct business with Iran, Cuba, Sudan or Syria, we may not be successful in ensuring compliance with limitations or restrictions on business with these or other countries subject to economic sanctions. There can be no assurance that we will be in compliance with export control or economic sanctions laws and regulations in the future.

Any such violation could result in significant criminal or civil fines, penalties or other sanctions and repercussions, including reputational harm that could have a material adverse impact on our business, results of operations or financial condition.

***We rely on sales to a limited number of direct customers, including distributors, contractors, OEMs, partners and end-use customers for the substantial majority of our revenue, and the loss of one or more significant direct customers or several of our smaller direct customers could materially harm our business. In addition, we understand from our direct customers that a substantial majority of their sales of our products are to a small number of end-use customers and the loss of one or more significant end-use customers or several of our smaller end-use customers could materially harm our business.***

A substantial majority of our revenue is generated from sales to a limited number of direct customers, including distributors, contractors, OEMs, partners and end-use customers. For the years ended December 31, 2017, 2016 and 2015, total revenue from our top ten direct customers represented 69%, 67% and 64% of our revenues, respectively. Distribution International, Inc. and TechnipFMC represented 15% and 12% of our total revenue in 2017, respectively, Reliance Industries Limited and Distribution International, Inc. represented 25% and 12% of our total revenue in 2016, respectively; and Reliance Industries Limited and Distribution International, Inc. represented 14% and 12% of our total revenue in 2015, respectively. Although the composition of our significant distributors, contractors, OEMs, partners and end-use customers will vary from period to period, we expect that most of our revenues will continue, for the foreseeable future, to come from sales to a relatively small number of direct customers. In addition, we understand from our direct customers that a substantial majority of their sales of our products are to a small number of end-use customers.

Our direct customer concentration also creates accounts receivable concentrations and related risks. As of December 31, 2017, Reliance Industries Limited, Distribution International, Inc. and Qualiman Engenharia accounted for 19%, 14% and 11% of our accounts receivable, respectively.

The substantial majority of our sales to distributors are transacted on a purchase order basis. The contracts we enter into with our direct customers generally do not include long-term commitments or minimum volumes that ensure future sales of our products. In addition, we understand that our direct customers' contracts with end-use customers also generally do not include such commitments or minimums. Consequently, our results of operations may fluctuate significantly from period-to-period based on the actions of one or more significant direct customers or end-use customers.

A direct customer may take actions that affect us for reasons that we cannot anticipate or control, such as reasons related to an end-use customer's financial condition, changes in business strategy or operations, the introduction of alternative competing products, or as the result of the perceived quality or cost-effectiveness of our products. Our agreements with these direct customers may be cancelled if we fail to meet certain product specifications or materially breach the agreement or for other reasons outside of our control. In addition, our direct customers may seek to renegotiate the terms of current agreements or renewals. The loss of, or a reduction in sales or anticipated sales to, one or more of our significant direct customers or end-use customers or several of our smaller direct customers or end-use customers could have a material adverse effect on our business, financial condition and results of operations.

***If we are unable to maintain our technological advantage over our competitors, our business may be materially adversely affected.***

We research, develop, manufacture and sell high-performance aerogel insulation products. Rapid and ongoing changes in technology and product standards could quickly render our products less competitive, or even obsolete, particularly if we fail to continue to improve the performance of our insulation products. We are currently developing new applications for our existing products as well as new aerogel technologies; however, we may not be successful in doing so and new applications or technologies

may not be commercially useful. Other companies that are seeking to enhance traditional insulation materials have recently introduced or are developing other emerging insulation technologies. These competitors are engaged in significant development work on these various insulation products. Competing technologies that outperform our insulation in one or more performance attributes could be developed and successfully introduced.

We are also aware of certain companies, including Guangdong Alison Hi-Tech Co, Ltd and Nano Tech Co, Ltd, that have developed or are developing products using aerogel technology similar to our technology and these or other companies have introduced or could introduce aerogel products that compete directly with our products and could in the future outperform them in one or more performance attributes, could be offered to our customers as a cheaper alternative to our products or may result in pricing pressure on us. As a result of this increasing current competition and potential future competition, our products may not compete effectively in our target markets.

***Negative perceptions regarding the safety, quality or other attributes of our products or a failure or a perceived failure of our products could have a material adverse effect on our results of operations and could make us unable to continue our business.***

Given the history of asbestos as an insulation material, we believe that there is an elevated level of attention towards perceived health and safety risks in the insulation industry. As a consequence, it is essential to our existing business and to our future growth that our products are considered safe. Even modest perceptions by existing or potential distributors, contractors or end-use customers in our target markets that our products are not safe could have a critical impact on our ability to sell our products and to continue as a business. Further, our competitors have in the past, and may in the future, seek to create or perpetuate such perceptions. There is risk of an actual or perceived failure of our products or other negative perceptions regarding our products, such as perceived health hazards. For example, dust is produced by our products during their installation and use, which increases the likelihood of the perception of a hazard. Another example is the potential in very high temperature applications for material failure. Like most insulation products, our Pyrogel XT and XT-E products will normally go through a controlled burn-in process immediately after exposure to high temperatures. If installed improperly, the burn-in may proceed too rapidly and the material may become damaged. In addition, the thermal performance of our materials may degrade over time due to a variety of operational or environmental conditions. We take steps to educate our distributors, contractors, OEMs and end-use customers on the nature of our products and the proper installation and operating procedures in order to mitigate these risks. Such an event, or the perception of such an event, could quickly result in our direct and end-use customers replacing our products with traditional insulation materials which could have a material adverse effect on our results of operations.

***Our activities and operations are subject to numerous health and safety laws and regulations. If we violate such regulations, we could face penalties and fines or be required to curtail or cease operations.***

We are subject to numerous health and safety laws and regulations in each of the jurisdictions in which we operate. These health and safety laws and regulations apply to us including with regard to hazardous substances that we use in our manufacturing process and that certain of our products contain. These substances include titanium dioxide, iron oxide, ethanol and carbon black, each of which has been determined, in certain forms, with certain contaminants and at certain levels, to be hazardous, possibly carcinogenic or otherwise harmful to humans. We may also consider and adopt the use of other hazardous substances or substances potentially containing hazardous contaminants, with similar or higher risks in connection with new products or modifications to our current products and related manufacturing.

Our processes also require the use of other regulated substances in raw material delivery and manufacturing, including among others, ethanol. Applicable laws and regulations require us to obtain and maintain permits and approvals and implement health and safety programs and procedures to control risks associated with our operations. Compliance with those laws and regulations can require us to incur substantial costs. Moreover, if our compliance programs are not successful, we could be subject to penalties or to revocation of our permits, which may require us to curtail or cease operations of the affected facilities. In particular, the construction of our second manufacturing facility will require us to obtain and maintain new permits from various regulatory authorities and if the issuance of such permits is delayed or denied, it would slow or potentially prevent the expansion of our manufacturing capacity. Violations of laws, regulations and permit requirements may also result in criminal sanctions, injunctions and the denial or revocation of our various permits.

While we use hazardous substances, including titanium dioxide and carbon black, in forms and at levels that are subject to current rules and regulations, such rules and regulations may become more stringent such that we are required to modify our manufacturing process and such that our customers' use of our products may be impacted. Changes in the products or manufacturing processes may require the customers to perform an extensive re-qualification process, which our customers may not want to undertake for various reasons, resulting in the customer switching to competing products. In addition, changes in our production or manufacturing process may result in uses above currently permitted levels. Such uses or changes in rules or regulations could materially adversely affect our business, financial condition and results of operations.



Health and safety laws, regulations and permit requirements may become more stringent or otherwise change. Any such changes could require us to incur materially higher costs than we currently have. Our costs of complying with current and future health and safety laws, regulations and permit requirements, and any liabilities, fines or other sanctions resulting from violations of them, could adversely affect our business, financial condition and results of operations.

***We may face certain product liability or warranty claims on our products, including from improper installation of our products by third parties. As a consequence, we could lose existing and future business and our ability to develop, market and sell our insulation could be harmed.***

The design, development, production and sale of our products involve an inherent risk of product liability claims and associated adverse publicity. We may be named directly in product liability suits relating to our products, even for defects resulting from errors of our distributors, contractors, OEMs, partners or end-use customers. These claims could be brought by various parties, including distributors, contractors, OEMs, partners and other direct end-use customers who are purchasing products directly from us, or end-use customers who purchase our products from our distributors. We could also be named as co-parties in product liability suits that are brought against the distributors, contractors, OEMs, partners and end-use customers. Our products are often installed in our end-use customers' complex and capital intensive facilities in inherently hazardous or dangerous environments, including in the energy, petrochemical and power generation industries, where the potential liability from risk of loss could be substantial. The failure of our products to perform to customer expectations, whether or not because of improper installation, could give rise to warranty claims against us. We take steps to educate our distributors, contractors, OEMs, partners and end-use customers about the proper installation procedures to mitigate the risk of an uncontrolled burn-in for very high temperature applications of Pyrogel XT and XT-E. However, installation of our products is handled by third parties over whom we have no control and errors or defects in their installation may also give rise to claims against us, diminish our brand or divert our resources from other purposes. Any of these claims, even if without merit, could result in costly litigation or divert management's attention and resources. In addition, many of our products are integrated into the final products of our customers. The integration of our products may entail the risk of product liability or warranty claims based on malfunctions or hazards from both our products and the final products of our customers.

A material product liability claim may seriously harm our results of operations, as well as damage our customer relationships and reputation. Although we carry general liability insurance, our current insurance coverage could be insufficient to protect us from all liability that may be imposed under these types of claims. Insurance coverage is expensive, may be difficult to obtain and may not be available in the future on acceptable terms or at all. Our distributors, contractors, OEMs, partners and end-use customers may not have adequate insurance to cover against potential claims. This insurance may not provide adequate coverage against potential losses, and if claims or losses exceed our liability insurance coverage, we may go out of business. In addition, insurance coverage may become more expensive, which would harm our results of operations.

***We may incur significant costs complying with environmental, health and safety laws and related claims, and failure to comply with these laws and regulations could expose us to significant liabilities, which could materially adversely affect our results of operations.***

Costs of compliance with regional, national, state and local existing and future environmental, health and safety laws and regulations could adversely affect our cash flow and results of operations. We are required to comply with numerous environmental laws and regulations and to obtain numerous governmental permits in order to operate our facilities and in connection with the design, development, manufacture and transport of our products and the storage, use, handling and disposal of hazardous substances, including environmental, health and safety laws, regulations and permits governing air emissions. We may incur significant additional costs to comply with these requirements. If we fail to comply with these requirements, we could be subject to civil or criminal liability, damages and fines, and our operations could be curtailed, suspended or shutdown. In addition, certain foreign laws and regulations may affect our ability to export products outside of the United States. Existing environmental, health and safety laws and regulations could be revised or reinterpreted and new laws and regulations could be adopted or become applicable to us or our products, and future changes in environmental, health and safety laws and regulations could occur. These factors may materially increase the amount we must invest to bring our processes into compliance and impose additional expense on our operations.

Among the changes to environmental laws and regulations that could occur is the adoption of regulatory frameworks to reduce greenhouse gas emissions, which a number of countries, particularly in the European Union, have adopted, or are considering adopting, including the 2015 Paris Agreement on climate change. These include adoption of cap and trade regimes, carbon taxes, restrictive permitting, increased efficiency standards, and incentives or mandates for renewable energy, any of which could increase the costs of manufacturing our products and increase our compliance costs, which could materially adversely affect our business and results of operations.

In addition, private lawsuits, including claims for remediation of contamination, personal injury or property damage, or actions by regional, national, state and local regulatory agencies, including enforcement or cost-recovery actions, may materially increase our

costs. Certain environmental laws make us potentially liable on a joint and several basis for the remediation of contamination at or emanating from properties or facilities that we currently or formerly owned or operated or properties to which we arranged for the disposal of hazardous substances. Such liability may require us to pay more than our fair share and could require us to address contamination caused by others. For example, the site of our East Providence facility contains certain levels of contamination caused by prior third-party activities on and near the site. Such contamination remains in place under a state-approved deed restriction, and we are required to comply with such deed restriction and the accompanying soil management plan. In general, the deed restriction prohibits the residential use of the property and the use of groundwater as potable water, and requires the maintenance of engineering controls and annual inspections to help prevent exposure to contaminated soils. The soil management plan requires us to notify the state environmental agency with respect to any soil excavation, stockpiling, sampling and off-site disposal of excavated soil. Although we have not had to make material expenditures to satisfy these requirements to date, in the future, we may incur additional costs to comply with these requirements and failure to do so could disrupt the operation of our facility or could subject us to liability for environmental remediation. We may incur liability relating to the remediation of contamination, including contamination we did not cause. Furthermore, ethanol, one of the materials that we handle in large quantities in our manufacturing process is subject to additional laws and regulations including those administered by the U.S. Alcohol and Tobacco Tax and Trade Bureau. While we seek to comply with the stringent requirements of these laws and regulations, these laws and regulations are complex and are subject to interpretation. Any changes in these laws or regulations or changes in our manufacturing processes may require us to request changes to our existing permits or obtain new permits. Any requests to change our existing permits or obtain new permits may be delayed or denied and may require us to modify our manufacturing processes, which could be costly and time consuming and could adversely affect our business and results of operations.

We may not be able to obtain or maintain, from time to time, all required environmental regulatory approvals. A delay in obtaining any required environmental regulatory approvals or failure to obtain and comply with them could materially adversely affect our business and results of operations.

***Failure by us to develop, maintain and strengthen strategic relationships with industry leaders to commercialize our products, particularly in the building materials market, may adversely affect our results of operations and our ability to grow our business.***

Our business strategy requires us to align the design and performance attributes of our products to the evolving needs of the market. To facilitate this process, we have sought out partnerships and relationships with industry leaders in order to assist in the development and commercialization of our products. We face competition from other manufacturers of insulation in seeking out and entering into such partnerships and relationships with industry leaders in our target markets and we may therefore not be successful in establishing strategic relationships in those markets.

In the building materials market, we have entered into a supply agreement and a side agreement (together, the supply agreement) with BASF Polyurethanes GmbH (BASF) and a joint development agreement with BASF SE. Pursuant to the supply agreement, we will sell exclusively to BASF our Spaceloft A2 product at annual volumes to be specified by BASF, subject to certain volume limits. The joint development agreement is designed to facilitate the collaboration between the parties on the development and commercialization of new products.

In addition to the customary terms associated with supply agreements, in support of our capacity expansion plan, process optimization projects, and research and development activities, BASF, in its sole discretion, may make advances, or prepayments, to us in the aggregate amount of up to \$22 million during the term of the Supply Agreement. BASF has agreed to make a prepayment in the amount of \$5 million to us in two installments in 2018. We have secured our obligation to repay the prepayment with a first priority security interest in real estate, machinery and equipment located at our existing manufacturing facility in East Providence, Rhode Island. Additionally, we have granted non-exclusive licenses to our subsidiaries under our intellectual property as necessary to operate such machinery and equipment.

After January 1, 2019, we will credit 25.3% of any amounts that we invoice for Spaceloft A2 product sold to BASF against the outstanding balance of the 2018 prepayment, if any, with such credits limited to a specified annual amount. BASF has no obligation to purchase Product under the supply agreement. If any of the 2018 prepayment remains uncredited as of December 31, 2021, BASF may request that we repay the uncredited amount to BASF. The amounts and terms of additional prepayment installments, if any, are subject to further negotiation between us and BASF.

Although BASF has placed orders for product under the supply agreement, there can be no assurance that BASF will ever be a significant customer for our products. Furthermore, there can be no assurance that we or BASF will be able to perform under the supply agreement or the joint development agreement or achieve our or its respective goals with respect to the supply agreement, the joint development agreement or the broader relationship between us and BASF. In addition, our grant of a security interest to BASF may make it more difficult for us to pledge our assets to secure other obligations, including to potential lenders, and as a result may impede our ability to incur additional indebtedness in the future.

In the event that we are unable to develop products that meet market needs or maintain our relationship with BASF, we may be required to find less prominent partners in the building materials market and we may be less able or unable to successfully penetrate that market. As a result of any of the above, we may lessen or lose our ability to grow our business in the building materials market which could adversely affect our business, financial condition and results of operations, including impairing our profitability .

***We have entered into and may enter into future agreements that may limit our ability to broadly market our products or could involve future obligations, which could make it more difficult for us to commercialize certain of our products and negatively affect our business and results of operations.***

We have a joint development agreement with BASF to develop products in the building materials market. In order to develop and commercialize our products, we may enter into additional joint development agreements or commercial arrangements. We cannot be certain that any products will be successfully developed under any such agreement or, even if developed, that they will be successfully produced or commercialized. These agreements may contain exclusivity, ownership and other terms that may limit our ability to commercialize any products or technology developed in connection with such agreements, including in ways that we do not envision at the time of entering into the agreement. In addition, these agreements may not obligate either party to make any purchases and may contain technical specifications that must be achieved to the satisfaction of our partner, which we cannot be certain we will be able to achieve. If our ability to commercialize products or technology developed in connection with these agreements is limited or if we fail to achieve the technical specifications that may be required, then our business, financial condition and results of operations could be materially adversely affected.

***If we do not continue to develop and maintain distribution channels for our products and to meet our customers' demand for our products, our results of operations could be adversely affected.***

For a significant portion of our revenues, we rely on sales to distributors who then sell our products to end-users in our target markets. Our success depends, in part, on our maintaining satisfactory relationships with these distributors. Our distributors require us to meet expectations of delivery, quality and pricing of our products, at both the distribution channel level and at the level of the end-user of our products. If we fail to meet expected standards, our revenues would decline and this could materially adversely affect our business, results of operations and financial condition. In addition, we have been unable at times to produce sufficient amounts of our products to meet demand from our customers and we may not be able to avoid capacity constraints in the future if demand exceeds our expectations or we fail to expand the capacity of our existing East Providence, Rhode Island manufacturing facility or bring into operation as planned the second manufacturing facility to be located in Statesboro, Georgia. If we are unable to deliver our products within such short timeframes, we may be at risk of losing direct or end-use customers. Accordingly, shortfalls in sales could materially adversely affect our business and results of operations.

***The qualification process for our products can be lengthy and unpredictable, potentially delaying adoption of our products and causing us to incur significant expense potentially without recovery.***

Qualification of our products by many of our direct and end-use customers can be lengthy and unpredictable and many of these direct and end-use customers have extended budgeting and procurement processes. This extended sales process requires the dedication of significant time by our personnel and our use of significant financial resources, with no certainty of success or recovery of our related expenses. Furthermore, even after an extensive qualification process, our products may fail to meet the standards sought by our end-use customers and may not be qualified for use by such end-use customers. Additionally, our continued process improvements and cost-reduction efforts may require us or the end-users to re-qualify our products. Failure to qualify or re-qualify our products may result in us losing such companies as end-users of our products, which would cause a decrease in our revenue or revenue growth rate either of which could materially adversely affect our business and results of operations.

***Our revenue may fluctuate, which may result in a high degree of variability in our results of operations and make it difficult for us to plan based on our future outlook and to forecast our future performance.***

Our revenue may fluctuate from period to period due to a wide variety of factors. Since we rely on sales to a limited number of direct customers and end-use customers, changes in demand from one or more direct customers or end-users can significantly impact our revenue from period to period. In addition, the sales cycles for our products, including their qualification for use, are long and can result in unpredictability in our revenues. We expect to have an increasing percentage of our products sold for use in capital projects, which orders tend to be larger and more sporadic, that will further increase this unpredictability and the difficulty for us in forecasting quarterly or annual performance. Because of these factors, we have a limited basis on which to predict our quarterly revenue. Our profitability from period-to-period may also vary due to the mix of products that we sell in different periods. These factors may result in a high degree of variability in our results of operations and will make it difficult for us to accurately evaluate and plan based on our future outlook and to forecast quarterly or annual performance.

***Our results of operations could be materially adversely affected if our operating expenses incurred do not correspond with the timing of our revenues.***

Most of our operating expenses, such as manufacturing facility expenses, employee compensation and research expenses, are either relatively fixed in the short-term or incurred in advance of sales. In addition, our spending levels are based in part on our expectations regarding future revenues. As a result, if revenues for a particular quarter are below expectations, we may not be able to proportionately reduce operating expenses for that quarter. Our reliance on sales to a limited number of direct customers and end-use customers, the length of our sales cycles and the potentially increasing percentage of our products sold for use in capital projects each can cause sporadic demand for our products which would limit our ability to predict future sales. This limitation could result in our being unable to reduce spending quickly enough to compensate for reductions in sales and could therefore adversely affect our results of operations for any particular operating period.

***We are exposed to the credit risk of some of our direct customers, including distributors, contractors and OEMs, which subjects us to the risk of non-payment for our products.***

We distribute our products through a network of distributors, contractors and OEMs, some of which may not be well-capitalized and may be of a lower credit quality. This direct customer network subjects us to the risk of non-payment for our products. During 2017, we wrote off \$0.5 million in accounts receivable due to non-payment of amounts due by a single customer. In addition, during periods of economic downturn in the global economy, our exposure to credit risks from our direct customers may increase, and our efforts to monitor and mitigate the associated risks may not be effective. In the event of non-payment by one or more of our direct customers, our business, financial condition and results of operations could be materially adversely affected.

***Our working capital requirements involve estimates based on demand and production expectations and may decrease or increase beyond those currently anticipated, which could materially harm our results of operations and financial condition.***

In order to fulfill the product delivery requirements of our direct and end-use customers, we plan for working capital needs in advance of customer orders. As a result, we base our funding and inventory decisions on estimates of future demand. If demand for our products does not increase as quickly as we have estimated or drops off sharply, our inventory and expenses could rise, and our business and results of operations could suffer. Alternatively, if we experience sales in excess of our estimates, our working capital needs may be higher than those currently anticipated. Our ability to meet this excess customer demand depends on our ability to arrange for additional financing for any ongoing working capital shortages, since it is likely that cash flow from sales will lag behind these investment requirements. In addition, we plan to increase our inventory in the longer term in order to meet our expected future demand. This would result in an increase in our working capital requirements that could harm our results of operations and financial condition.

***Breakdowns, security breaches, loss of data and other disruptions of our information technology systems could compromise sensitive information related to our business, prevent us from accessing critical information and expose us to liability, which would cause our business and reputation to suffer.***

In the ordinary course of our business, we collect and store sensitive data, including intellectual property, our proprietary business information and that of our suppliers, customers and business partners, and personally identifiable information about our employees. We manage and maintain our applications and data utilizing on-site and off-site systems. These applications and data encompass a wide variety of business critical information including research and development information, commercial information and business and financial information.

The secure processing, storage, maintenance and transmission of this critical information is vital to our operations and business strategy, and we devote resources to protecting such information. Although we take measures to protect sensitive information from unauthorized access or disclosure, our information technology and infrastructure may be vulnerable to breakdowns, attacks by hackers, viruses, breaches or interruptions due to employee error, malfeasance or other disruptions, or lapses in compliance with privacy and security mandates. Any such virus, breakdown, attack, breach or interruption could compromise our networks and the information stored there could be accessed by unauthorized parties, publicly disclosed, lost or stolen. We have measures in place that are designed to detect and respond to such security incidents and breaches of privacy and security mandates, but there can be no assurance that our management or diligence efforts will prevent such breakdowns or breaches in our systems. Any such access, disclosure or other loss of information could result in legal claims or proceedings, liability under laws that protect the privacy of personal information or other laws, government enforcement actions and regulatory penalties. Unauthorized access, loss or dissemination could also disrupt our operations, customer support services, research and development activities, capture of company financial information, various general and administrative aspects of our business and damage our reputation, any of which could adversely affect our business.

***Our contracts with U.S. government agencies may subject us to audits, criminal penalties, sanctions and other expenses and fines.***

We perform contract research services for U.S. government agencies and our products are sold to customers that may incorporate them into government projects. U.S. government agencies, including the Defense Contract Audit Agency and the Department of Labor, routinely audit government contractors. These agencies review a contractor's compliance with contract terms and conditions, performance under its contracts, cost structure and compliance with applicable laws, regulations and standards. The U.S. government also may review the adequacy of a contractor's systems and policies, including a contractor's purchasing, property, estimating, billing, accounting, compensation and management information systems. Any costs found to be overcharged or improperly allocated to a specific contract or any amounts improperly billed or charged for products or services will be subject to reimbursement to the government. As a government contractor, we are required to disclose to the U.S. government credible evidence of certain violations of law and contract overpayments. If we are found to have participated in improper or illegal activities, we may be subject to civil and criminal penalties and administrative sanctions, including termination of contracts, forfeiture of profits, suspension of payments, fines and suspension or prohibition from doing business with the U.S. government. Any negative publicity related to such contracts, regardless of the accuracy of such publicity, may adversely affect our business or reputation.

***Our contracts with U.S. government agencies may not be funded by future appropriations and are subject to modification or termination at any time prior to their completion.***

Our contracts with U.S. government agencies are subject to the availability of appropriated funds. The U.S. government funds our contract research work through a variety of funding programs that rely on monies appropriated by Congress. At any point, the availability of funding could change, thus reducing the opportunities for new or continued revenues to us from government contract work. Revenue from contracts with U.S. government agencies constituted 2% of our total revenue in each of 2017, 2016 and 2015, respectively. We expect that our revenue under such contracts will decline due to the recent trend toward tightening of federal spending guidelines and programs.

In addition, under our contracts, the U.S. government generally has the right not to exercise options to extend or expand our contracts and may modify, curtail or terminate the contracts at its convenience. Our government customers may not renew our existing contracts after the conclusion of their terms and we may not be able to enter into new contracts with U.S. government agencies. Any decision by the U.S. government not to exercise contract options or to modify, curtail or terminate our contracts or not to renew our contracts or enter into new contracts with us would adversely affect our revenues.

***Our revolving credit facility contains financial and operating restrictions that may limit our access to credit. In addition, our revolving credit facility expires on April 28, 2018 and we may not be able to renew, extend or replace the expiring facility. If we fail to comply with covenants in our revolving credit facility or if facility is terminated, we may be required to repay our indebtedness thereunder, which may have an adverse effect on our liquidity .***

Provisions governing our revolving credit facility impose restrictions on our ability to operate, including, for some of the agreements and instruments, but not for others, our ability to:

- incur capital expenditures;
- incur additional debt;
- pay dividends and make distributions;
- redeem or repurchase capital stock;
- create liens;
- enter into transactions with affiliates; and
- merge or consolidate with or into other entities.

Our revolving credit facility also contains other customary covenants. We may not be able to comply with these covenants in the future. Our failure to comply with these covenants may result in the declaration of an event of default and could cause us to be unable to borrow funds under our revolving credit facility. In addition to preventing additional borrowings under our revolving credit facility, an event of default, if not cured or waived, may result in the acceleration of the maturity of indebtedness outstanding under the revolving credit facility, which would require us to pay all amounts outstanding. Such an event may also lead our lender to exercise its security interest in our assets, including all of our real property and equipment at our East Providence facility. If an event of default occurs, we may not be able to cure it within any applicable cure period, if at all. If the maturity of our indebtedness is accelerated, we may not have sufficient funds available for repayment or we may not have the ability to borrow or obtain sufficient funds to replace the accelerated indebtedness on terms acceptable to us, or at all.

***If we lose key personnel upon whom we are dependent, or if we are unable to successfully recruit and retain skilled employees, we may not be able to manage our operations and meet our strategic objectives.***

Our continued success depends to a considerable degree upon the continued services of a small number of our employees with critical knowledge of our products, our manufacturing process, our intellectual property, our customers and our global operations. The loss or unavailability of any of these individuals could harm our ability to execute our business plan, maintain important business relationships and complete certain product development initiatives, which could harm our business. In the event that any of these key individuals leave their employment with us or take new employment with a competitor, our business and results of operations could be materially adversely affected. In addition, our continued success depends upon the availability, contributions, vision, skills, experience and effort of our senior management, financial, sales and marketing, engineering and production teams. We do not maintain “key person” insurance on any of our employees. We have entered into employment agreements with certain members of our senior management team, but none of these agreements guarantee the services of the individual for a specified period of time. All of the agreements with members of our senior management team provide that employment is at-will and may be terminated by the employee at any time and without notice.

Although we do not have any reason to believe that we may lose the services of any our employees with critical knowledge of our products, our manufacturing processes, our customers and our global operations or any of our senior management, financial, sales and marketing, engineering and production teams in the foreseeable future, the loss of the services of any of these individuals might impede our operations or the achievement of our strategic and financial objectives. The loss or interruption of the service of any of these individuals or our inability to attract or retain other qualified personnel or advisors could have a material adverse effect on our business, financial condition and results of operations and could significantly reduce our ability to manage our operations and implement our strategy.

***Our ability to use our net operating loss carryforwards may be subject to limitation, which could result in a higher effective tax rate and adversely affect our financial condition and results of operations.***

During 2014, we performed analyses pursuant to Section 382 of the Internal Revenue Code of 1986, as amended, or the Internal Revenue Code, as well as similar state provisions, in order to determine whether any limitations might exist on the utilization of net operating losses and other tax attributes. Generally, a change of more than 50% in the ownership of a company’s stock, by value, over a three year period constitutes an ownership change for U.S. federal income tax purposes. An ownership change may limit a company’s ability to use its net operating loss carryforwards attributable to the period prior to such change. Based on these analyses, we determined that it is more likely than not that an ownership change occurred on June 18, 2014 upon the closing of our IPO, resulting in an annual limitation on the use of our net operating losses and other tax attributes as of such date. As a result, our prior net operating losses were limited to \$155.2 million, including built-in gains of \$42.0 million at the date of that ownership change. The use of our net operating loss carryforwards may be restricted further in the event of any future changes in our ownership.

***We may not be able to successfully develop and introduce new products in a timely manner at competitive prices, which would limit our ability to grow and maintain our competitive position and could adversely affect our financial conditions, results of operations and cash flow.***

Our growth depends, in part, on continued sales of existing products, including by improving the performance of existing products, as well as the successful development and introduction of new products, which face the uncertainty of customer acceptance and reaction from competitors. New product development requires considerable resources and attention that may shift our focus from and may disrupt our current operations, given that we have fewer resources than many of our competitors. We may not be able to sustainably manufacture new products with attractive margins and we may experience higher yield losses than expected. Any delay in the development or launch of a new product could result in our not being the first to market, which could compromise our competitive position. Even if we manage to develop and introduce new products, such products may not address market needs or otherwise compete with third party products. Even if our new products are adopted by the market, we may not achieve the growth in revenue that we expect from such new products and our investment in these efforts may not be proportional to our expected or actual revenue growth. If we are unable to develop and introduce new products in a cost-effective manner or otherwise manage effectively the operations related to new products, our results of operations and financial condition could be adversely impacted.

## **Risks Related to Our Intellectual Property**

***Our inability to protect our intellectual property rights could negatively affect our business and results of operations.***

Our ability to compete effectively depends in part upon developing, maintaining and/or protecting intellectual property rights relevant to our aerogel product forms, applications, manufacturing technologies and brand names. We rely principally on a combination of patent protection, trade secret laws, confidentiality and nondisclosure agreements, trademark registrations, common

law rights and licensing arrangements to establish and protect the intellectual property rights relevant to our business. However, these measures may not be adequate in every given case to permit us to gain or keep any competitive advantage, particularly in those countries where the laws do not protect our proprietary rights as fully as or where the enforcement tools are weaker or less effective than those in the United States. In particular, since aerogels were developed approximately 80 years ago, there has been a wide range of research, development and publication related to aerogels, which makes it difficult to establish intellectual property rights to many key elements of aerogel technology and to obtain patent protection. Accordingly, much of the general technology that we use in our manufacture of aerogel blankets is not protected by patents.

Where we consider it appropriate, our strategy is to seek patent protection in the United States and other countries on technologies used in or relating to our aerogel product forms, applications and manufacturing technologies. As of December 31, 2017, we had 39 issued U.S. patents and 68 issued foreign patents, including three U.S. patents and 18 foreign patents that we co-own with third parties. The issuance of a patent is not conclusive as to its scope, validity or enforceability. Thus, any patent held by us or to be issued to us from a pending patent application, could be challenged, invalidated or held unenforceable in litigation or proceedings before the U.S. Patent and Trademark Office, or USPTO, and/or other patent tribunals. Third parties could develop technologies that circumvent the patent protection we have secured. No consistent policy regarding the breadth of patent claims has emerged to date in the United States and the landscape could become more uncertain in view of future rule changes by the USPTO, the introduction of patent reform legislation and decisions in patent law cases by the federal courts including the United States Supreme Court.

The patent landscape outside the United States is even less predictable. As a result, the validity and enforceability of patents cannot be predicted with certainty. For example, we are aware of competitors that manufacture and market aerogel insulation products in China, where it may be difficult for us to enforce our intellectual property rights against these or other competitors. In May 2016, we filed a complaint for patent infringement against Nano Tech Co., Ltd. (Nano) and Guangdong Alison Hi-Tech., Ltd., (Alison) which we refer to collectively as the Respondents, in the United States International Trade Commission, or ITC. In addition to Respondents' contention at the ITC that the patents we asserted there are invalid, Alison also filed petitions with United States Patent and Trademark Office requesting Inter-Partes Review to cancel certain claims in three of our manufacturing process patents and a product patent. A three-member panel of Administrative Patent Judges at the USPTO denied all of Alison's petitions to institute Inter-Partes Review challenging the validity of Aspen patents. Alison also filed similar requests with the Chinese Patent Office (SIPO) seeking to invalidate two of our Chinese manufacturing process patents and two of our Chinese product patents. After the conclusion of the oral proceedings and before any decision issued by the SIPO, Alison withdrew all of its requests for invalidation of our Chinese patents. In September 2017, the Administrative Law Judge (ALJ) presiding over the ITC investigation issued an Initial Determination finding that Alison and Nano infringed our patents relating to aerogel insulation and/or methods of manufacturing aerogel insulation. As part of the Initial Determination, the ALJ found that Alison and Nano infringed all of the patent claims asserted against each of them across the three asserted patents, and that Alison and Nano failed to prove that the asserted claims were invalid. The ALJ also recommended a limited exclusion order as a remedy to prevent the importation of infringing aerogel products manufactured by Respondents into the United States. In February 2018, the ITC issued its final determination confirming the ALJ's infringement and validity determinations except with respect to one dependent product claim where the ITC found that the claim was not infringed. The ITC also revised some of the ALJ's claim constructions. In addition, the ITC issued a limited exclusion order prohibiting importation of infringing aerogel insulation products manufactured by Alison and Nano. The Respondents may appeal the final determination to the U.S. Court of Appeals for the Federal Circuit.

We also filed a patent infringement suit in April 2016 at the District Court in Mannheim, Germany against the Respondents and two European distributors. During 2016, we settled with one European distributor in exchange for a commitment not to procure infringing products and cooperation with our case. In January 2018, the court issued a series of judgments by acknowledgement (German, Anerkenntnisurteil) finding the second reseller, Hiltex Technische Weefsels b.v. (Hiltex), liable for infringement and also issued injunctions against Hiltex. The judgments resulted from a settlement agreement in which Hiltex agreed not to resell infringing products in Europe where at least one of the asserted patents are active. Nano initiated nullity actions in German Federal Court against three of our manufacturing process patents in Germany. Alison likewise filed an opposition to one of the asserted patents at the European Patent Office ("EPO") and also initiated nullity action against two other patents. Nano also filed an opposition against the same patent at the EPO. The litigation against the defendants, Alison and Nano, is ongoing. See "Risk Factors — We have initiated intellectual property litigation that will be costly, and could limit or invalidate our intellectual property rights, divert time and efforts away from business operations, require us to pay damages and/or costs and expenses and/or otherwise have an adverse material impact on our business, and we could become subject to additional intellectual property litigation in the future" below.

In addition, we may fail to apply for patents on important technologies or innovative products in a timely fashion, if at all, and our existing and future patents may not be sufficiently broad to prevent others from practicing our technologies or from developing competing products or technologies, in particular given the long history of aerogel development. Furthermore, third parties could practice our intellectual property rights in territories where we do not have patent protection. Such third parties may then try to import products made using our intellectual property rights into the United States or other countries. Our strategy is to seek registration of trademarks for our brands in many, but not all, of the jurisdictions in which we sell our products based on various factors, including

our sales volumes in the jurisdiction, our ability to enforce local laws and cost. Our strategy may not be adequate to protect our brands in all circumstances, especially in foreign jurisdictions.

As of December 31, 2017, we had 23 pending U.S. patent applications and 71 pending foreign patent applications, including one pending U.S. patent application and three foreign pending patent applications that we co-own with other third parties. Our pending patent applications are directed to various enabling technologies for the product forms, applications and manufacturing technologies that support our current business, as well as aspects of products under development or contemplated for the future. The issuance of patents from these applications involves complex legal and factual questions and, thus, we cannot provide assurance that any of our pending patent applications will result in the issuance of patents to us. The USPTO, relevant foreign patent offices and other relevant patent tribunals may deny or require significant narrowing of claims in our pending patent applications. Patents issued as a result of any of our pending patent applications may not cover our enabling technology and/or the products or processes that support our current or future business or afford us with significant commercial protection against others with similar technology. Proceedings before the USPTO could result in adverse decisions as to the priority of our inventions and the narrowing or invalidation of claims in issued patents. In addition, our pending patent applications filed in foreign countries are subject to laws, rules and procedures that differ from those of the United States, and thus foreign patent applications may not be granted even if counterpart United States patents are issued.

***We have initiated intellectual property litigation that is and will continue to be costly, and could limit or invalidate our intellectual property rights, divert time and efforts away from business operations, require us to pay damages and/or costs and expenses and/or otherwise have an material adverse impact on our business, and we could become subject to additional such intellectual property litigation in the future.***

The success of our business is highly dependent on protecting our intellectual property rights. Unauthorized parties may attempt to copy or otherwise obtain and use our products and/or enabling technology. Policing the unauthorized use of our intellectual property rights is difficult and expensive, as is enforcing these rights against unauthorized use by others. Identifying unauthorized use of our intellectual property rights is difficult because we may be unable to monitor the technologies and/or materials being employed by other parties. The steps we have taken or will take may not prevent unauthorized use of our intellectual property rights, particularly in foreign countries where enforcement of intellectual property rights may be more difficult than in the United States.

In May 2016, we filed a complaint for patent infringement against Nano Tech Co., Ltd. and Guangdong Alison Hi-Tech., Ltd., which we refer to collectively as the Respondents, in the United States International Trade Commission. The ITC complaint alleged that these two China-based companies have engaged and are engaging in unfair trade practices by importing and selling aerogel products in the United States that infringe, and/or are manufactured by processes that infringe, several of our patents. In the ITC complaint, we sought exclusion orders from the ITC that direct the United States Customs and Border Protection to stop the importation of infringing products. In June 2016, the ITC instituted an investigation based on our complaint. In September 2017, the Administrative Law Judge (ALJ) presiding over the ITC investigation issued an Initial Determination finding that Alison and Nano infringed three of our patents relating to aerogel insulation and/or methods of manufacturing aerogel insulation. As part of the Initial Determination, the ALJ found that Alison and Nano infringed all the patent claims asserted against each of them and that Alison and Nano failed to prove that the asserted claims were invalid. The ALJ also recommended a limited exclusion order as a remedy to prevent the importation of infringing aerogel products into the United States. In February 2018, the ITC issued its final determination confirming the ALJ's infringement and validity determinations except with respect to one dependent product claim where the ITC found that the claim was not infringed. The ITC also revised some of the ALJ's claim construction. In addition, the ITC issued a limited exclusion order prohibiting importation of infringing aerogel insulation products manufactured by Alison and Nano. The Respondents may appeal the final determination to the U.S. Court of Appeals for the Federal Circuit.

In addition to Respondents' contention at the ITC that the patents we asserted there are invalid, Alison also filed petitions with USPTO requesting Inter-Partes Review to cancel certain claims in three of Aspen's manufacturing process patents and one product patent. A three-member panel of Administrative Patent Judges at the USPTO denied all of Alison's petitions to institute Inter-Partes Review challenging the validity of these Aspen patents. Alison also filed similar requests with the Chinese Patent Office ("SIPO") seeking to invalidate two of our Chinese manufacturing process patents and two of our Chinese product patents. After the conclusion of the oral proceedings and before any decision issued by the SIPO, Alison withdrew all of its requests for invalidation of our Chinese patents.

We also filed a patent infringement suit in April 2016 at the District Court in Mannheim, Germany against the Respondents and two European distributors. During 2016, we settled with one of the European distributors in exchange for a commitment not to procure infringing products and cooperation with our case. In January 2018, the court issued a series of judgments by acknowledgement (German, Anerkenntnisurteil ) finding the second reseller, Hiltex Technische Weefsels b.v. (Hiltex), liable for infringement and also issued injunctions against Hiltex. The judgments resulted from a settlement agreement in which Hiltex agreed not to resell infringing products in Europe where at least one of the asserted patents are active. The litigation against Nano and Alison remains ongoing. Nano



has initiated nullity actions in German Federal Court against three of our manufacturing process patents in Germany. Alison likewise filed an opposition to one of the asserted patents at the European Patent Office (EPO) and also initiated nullity action against two other patents. Nano also filed an opposition against the same patent at the EPO. As Alison and Nano have already sought to invalidate our patents in various jurisdictions, we expect defendants to bring similar actions in additional jurisdictions or against additional patents and that we will incur additional costs to defend such actions. Due to their nature, it is difficult to predict the outcome or the costs involved in any litigation or administrative proceeding. Furthermore, the defendants may have significant resources and interest to litigate and, therefore, this litigation could be protracted and may ultimately involve significant legal expenses.

Our continued commercial success will also depend in part upon not infringing the patents or violating other intellectual property rights of third parties. We are aware of patents and patent applications generally relating to aspects of our technologies filed by, and issued to, third parties. Our knowledge of the patent landscape with respect to the technologies currently embodied within our aerogel products and the technologies that we practice in manufacturing those products indicates that the third-party patent rights most relevant to our business are those owned by Cabot and licensed to us under the cross license agreement with Cabot. Nevertheless, we cannot determine with certainty whether patents or patent applications of other parties may materially affect our ability to conduct our business. There may be existing patents of which we are unaware that we may inadvertently infringe, resulting in claims against us or our customers. In recent years, Chinese, Japanese and South Korean entities have filed a significant number of patent applications related to aerogel products in both their home countries and in foreign countries. These patents in application areas of aerogels may make it more difficult for OEMs and end-use customers in these countries to use our products in new and different applications, which in turn may limit our ability to penetrate new markets.

In the event that the manufacture, use and/or sale of our products or technologies is challenged, or if our product forms or technologies conflict with patent rights of others or our operations conflict with trademark or similar rights of others, third parties could bring legal actions against us in the United States, Europe or other countries, claiming damages and seeking to enjoin the manufacturing and/or marketing of our products. In addition, it is not possible to predict with certainty what patent claims may arise from pending patent applications of third parties. In the United States, for example, patent prosecution can proceed in secret prior to issuance of a patent, provided such application is not filed in a foreign jurisdiction. For U.S. patent applications that are also filed in foreign jurisdictions, such patent applications will not be published until 18 months from the filing date of the application. As a result, third parties may be able to obtain patents with claims relating to our product forms, applications and/or manufacturing processes which they could attempt to assert against us or our end-users.

In the case of any of the above, litigation may be necessary to enforce, protect or defend our intellectual property rights or to determine the validity and scope of the intellectual property rights of others. Any such litigation, including our ongoing patent enforcement actions described above, could be unsuccessful, cause us to incur substantial costs, divert resources and the efforts of our personnel away from daily operations, harm our reputation and/or result in the impairment of our intellectual property rights. In some cases, litigation may be threatened or brought by a patent holding company (otherwise known as non-practicing entities or patent “trolls”) or other adverse patent owner who has no relevant product revenues and against which our patents may provide little or no deterrence. If we are found to infringe any patents, regardless of whether litigation is brought against us by third parties or, as in the case of our ongoing patent enforcement actions described above, brought by us against third parties, we could be required to:

- pay substantial monetary damages, including lost profits, reasonable royalties and/or treble damages if an infringement is found to be willful;
- totally discontinue or substantially modify any products or processes that are found to be in violation of another party’s intellectual property rights; and/or
- seek a license to continue making and selling our products and/or using our manufacturing processes, which we may not be able to obtain on reasonable terms, if at all, which could significantly increase our operating expenses and/or decrease our revenue.

In the actions brought by us against third parties, including our ongoing patent enforcement actions described above, we may be required to pay costs and expenses of opposing parties, including attorney fees, if we lose.

If our competitors are able to use our technology without payment to us, our ability to compete effectively could be materially harmed. Our contracts generally indemnify our customers for third-party claims of intellectual property infringement related to the manufacture and use of our products, and typically up to the amount of the purchase price paid for the product, which could cause us to become involved, and subject to liability, in litigation between our customers and third parties. The expense of defending these claims may adversely affect our results of operations.

***Patents covering technologies that are similar or superior to our technologies may be developed or obtained by third parties. We may need to seek licenses to these technologies, which could limit our ability to manufacture our products and have a material adverse effect on our business and results of operations.***

Competitors or other third parties may independently develop and obtain patents covering technologies that are similar or superior to the product forms, applications or manufacturing technologies that we employ. In such event, we may need to obtain licenses for these technologies. However, we may not be able to obtain licenses on reasonable terms, if at all, which could limit our ability to manufacture our current and/or future products and operate our business.

***Our contracts with the U.S. government and other third parties could negatively affect our intellectual property rights.***

To further our product development efforts, our scientists and engineers work closely with customers, the U.S. government and other third parties to research and develop advancements in aerogel product forms, applications and manufacturing technologies. We have entered into agreements with private third parties and have been awarded numerous research contracts with the U.S. government to independently or jointly research, design and develop new devices and systems that incorporate aerogel material. We also expect to enter into similar private agreements and be awarded similar government contracts in the future. In some instances, the research and development activities that we conduct under contract with the U.S. government and/or with private third parties may produce intellectual property to which we may not have ownership or exclusive rights and will be unable to protect or monetize.

Moreover, when we develop new technologies using U.S. government funding, the government may obtain certain rights in any resulting patents, technical data and/or other confidential and proprietary information, generally including, at a minimum, a non-exclusive license authorizing the U.S. government to use the invention, technical data or software for non-commercial purposes. Federal government funding may limit when and how we can deploy our technology developed under those contracts. In addition, inventions must be reported promptly to the funding agencies, the federal funding must be disclosed in any resulting patent applications, and our rights in such inventions will normally be subject to government license rights, periodic post-contract utilization reporting, foreign manufacturing restrictions and “march-in” rights. March-in rights refer to the right of the U.S. government to require us to grant a license to the technology to a responsible applicant or, if we refuse, the government may grant the license itself. The U.S. government may exercise its march-in rights if it determines that action is necessary because we fail to achieve practical application of any technology developed under contract with the government or because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations or to give preference to United States industry. The U.S. government may also have the right to disclose our confidential and proprietary information to third parties. In addition, failure to comply with all the government contract requirements may result in us losing the patent rights.

Our U.S. government-sponsored research contracts are also subject to audit and require that we provide regular written technical updates on a monthly, quarterly or annual basis, and, at the conclusion of the research contract, a final report on the results of our technical research. Because these reports are generally available to the public, third parties may obtain some aspects of our confidential and proprietary information relating to our product forms, applications and/or manufacturing processes. If we fail to provide these reports or to provide accurate and complete reports, the U.S. government could obtain rights to any intellectual property arising from the related research.

Furthermore, there could be disputes between us and a private third party as to the ownership rights to any inventions that we develop in collaboration with such third party. Any such dispute may cause us to incur substantial costs including potential license obligations, and could place a significant strain on our financial resources, divert the attention of management from our core business and harm our reputation.

***We rely on trade secrets to protect our technology, and our failure to obtain or maintain trade secret protection could materially adversely affect our competitive business position.***

We rely in part on trade secret protection to protect confidential and proprietary information relating to our technology, particularly where we do not believe patent protection is appropriate or obtainable. We continue to develop and refine the manufacturing technologies used to produce our aerogel products and believe that we have already developed, and will continue to develop, significant know-how related to these technologies. However, trade secrets can be difficult to protect. We may not be able to maintain the secrecy of this information and competitors may develop or acquire equally or more valuable information related to the manufacture of comparable aerogel products. Our strategy for scale-up of commercial production will continue to require us to share confidential and proprietary information with the U.S. government and other third parties. While we take reasonable efforts to protect our trade secrets, our employees, consultants, contractors or scientific and other advisors, or those of our business partners, may intentionally or inadvertently disclose our confidential and proprietary information to competitors. Any enforcement of claims by us that a third party has obtained and is using our trade secrets is expensive, time consuming and uncertain. In addition, foreign courts are sometimes less willing than United States courts to protect trade secrets.

We require all employees and consultants to execute confidentiality and/or nondisclosure agreements upon the commencement of an employment or consulting arrangement with us, which agreements generally require that all confidential and proprietary information developed by the individual or made known to the individual by us during the course of the individual's relationship with us be kept confidential and not disclosed to third parties. These agreements further generally provide that inventions conceived by the individual in the course of rendering services to us will be our exclusive property. Nevertheless, these agreements may not be honored and our confidential and proprietary information may be disclosed, or these agreements may be unenforceable or difficult to enforce. We also require customers and vendors to execute confidentiality and/or nondisclosure agreements. However, we have not obtained such agreements from all of our customers and vendors. Moreover, some of our customers may be subject to laws and regulations that require them to disclose information that we would otherwise seek to keep confidential. Our confidential and proprietary information may be otherwise disclosed without our authorization or knowledge. Moreover, third parties could reverse engineer our manufacturing processes, independently develop substantially equivalent confidential and proprietary information or otherwise gain access to our trade secrets. Failure to maintain trade secret protection could enable others to produce competing products and adversely affect our competitive business position.

***Loss of the intellectual property rights that we license from Cabot Corporation would have a material adverse impact on our business.***

We have licensed certain intellectual property rights from Cabot under a cross license agreement. These intellectual property rights have been critical to the manufacture of our existing products and may also be important to our research, development and manufacture of new products. Any loss of the intellectual property rights granted to us thereunder, including as a result of ineffective protection of such rights by Cabot, abandonment or expiration of the involved patents or a breach of or dispute under the agreement by either party would have a material adverse impact on our financial condition, results of operations and growth prospects, and might prevent us from continuing our business.

**Risks Related to Our Common Stock**

***We have incurred and will continue to incur costs and demands upon management as a result of complying with the laws and regulations affecting public companies in the United States, which may adversely affect our results of operations.***

We are subject to the reporting requirements of the Exchange Act that require us to file, among other things, quarterly reports on Form 10-Q and annual reports on Form 10-K. Under Section 302 of the Sarbanes-Oxley Act of 2002, or the Sarbanes-Oxley Act, as a part of each of these reports, our chief executive officer and chief financial officer are required to evaluate and report their conclusions regarding the effectiveness of our disclosure controls and procedures and to certify that they have done so. Effective internal controls are necessary for us to provide reliable financial reports and prevent fraud. Under Section 404 of the Sarbanes-Oxley Act, we have included a report of management on our internal control over financial reporting in our Form 10-K for our fiscal year ended December 31, 2017. In addition, upon the first annual report required to be filed with the SEC following the date we are no longer an "emerging growth company" as defined in the Jumpstart Our Business Startups Act, or JOBS Act, the independent registered public accounting firm auditing our financial statements will be required to attest to and report on the effectiveness of our internal control over financial reporting. The process of improving and documenting our internal controls and complying with Section 404 is expensive and time consuming, and requires significant attention of management.

Complying with these requirements applicable to public companies may place a strain on our personnel, information technology systems and resources while diverting management's attention from other business concerns. We have engaged outside service providers with appropriate public company compliance experience and technical accounting knowledge to support our compliance efforts. We may need to engage additional service providers to ensure compliance which may cause us to incur additional operating costs.

These and other requirements may also make it more difficult or more costly for us to obtain or maintain certain types of insurance, including directors' and officers' liability insurance. We may be forced to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage.

The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers. Any one of these requirements could have a material adverse effect on our business, financial condition and results of operations.

***Because we are a public company, we are obligated to develop and maintain proper and effective internal control over financial reporting. If our internal controls over financial reporting are determined to be ineffective, or if our auditors are otherwise unable to attest to their effectiveness when required, investor confidence in our company, and our common stock price, may be adversely affected.***

Pursuant to Section 404a of the Sarbanes-Oxley Act, we have furnished a report by management on the effectiveness of our internal control over financial reporting for the fiscal year ended December 31, 2017 and will continue to do so in each year thereafter. This assessment will be required to include disclosure of any material weaknesses identified by our management in our internal control over financial reporting. Our independent registered public accounting firm will not be required to formally attest to the effectiveness of our internal control over financial reporting until the first annual report required to be filed with the SEC following the date we are no longer an “emerging growth company,” as defined in the JOBS Act.

We continue to assess our system of internal controls over financial reporting and successfully completed documentation necessary to perform the annual evaluation required to comply with Section 404. In future periods, we may discover, and not be able to remediate timely, significant deficiencies or material weaknesses. During the evaluation and testing process in 2017, we did not identify any material weaknesses in our internal controls over financial reporting. In future periods, if we were to identify one or more material weaknesses in our internal control, we may be unable to assert that our internal controls are effective. If we are unable to assert that our internal controls over financial reporting are effective, we could lose investor confidence in the accuracy and completeness of our financial reports or it could cause us to fail to meet our reporting obligations, which could have a material adverse effect on the price of our common stock. In addition, any failure to comply with Section 404 could subject us to a variety of administrative sanctions, including SEC action, ineligibility for short form resale registration, the suspension or delisting of our common stock from The New York Stock Exchange, and the inability of registered broker-dealers to make a market in our common stock, which would further reduce our stock price and could harm our business.

***We are eligible to be treated as an “emerging growth company” as defined in the JOBS Act, and we cannot be certain if the reduced disclosure requirements applicable to emerging growth companies makes or will make our common stock less attractive to investors.***

We are an “emerging growth company”, as defined in the JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including:

- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, as described above;
- reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We will remain an emerging growth company until the earliest to occur of (i) the end of the fiscal year for which we report \$1.0 billion or more in annual revenues, (ii) the end of the fiscal year in which the market value of our common stock held by non-affiliates exceeds \$700 million on the last business day of our second fiscal quarter, (iii) our issuance, in a three year period, of more than \$1.0 billion of non-convertible debt, and (iv) December 31, 2019. We cannot predict if investors find or will find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

***The trading market in our common stock has been limited and substantially less liquid than the average trading market for a stock quoted on The New York Stock Exchange.***

Since our initial listing on The New York Stock Exchange on June 13, 2014, the trading market in our common stock has been limited and substantially less liquid than the average trading market for companies listed on The New York Stock Exchange. The listing of our common stock on The New York Stock Exchange does not assure that a meaningful, consistent and liquid trading market currently exists or will exist in the future. We cannot predict whether a more active market for our common stock will develop in the future. An absence of an active trading market could adversely affect our stockholders’ ability to sell our common stock at current market prices in short time periods, or possibly at all. An inactive market may also impair our ability to raise capital by selling our common stock and may impair our ability to acquire other companies, products or technologies by using our common stock as consideration. Additionally, analyst coverage of our common stock may be limited and such lack of coverage may have a depressive effect on the market price for our common stock. As of December 31, 2017, approximately 20.6% of our outstanding shares of common stock were held by our executive officers, directors, principal stockholders and their respective affiliates, which may adversely affect the liquidity of the trading market for our common stock, in as much as federal securities laws restrict sales of our

shares by these stockholders. If our affiliates continue to hold their shares of common stock, there will be a more limited trading volume in our common stock, which may make it more difficult for investors to sell their shares or increase the volatility of our stock price.

***We expect that the price of our common stock will fluctuate substantially, which could subject us to securities class action litigation and result in substantial losses to our stockholders.***

The price of our common stock may fluctuate substantially due to a number of factors, including the following, some of which are beyond our control:

- volume and timing of orders for our products;
- quarterly and yearly variations in our or our competitors' results of operations;
- our announcement or our competitors' announcements regarding new products, product enhancements, significant contracts, number of distributors, acquisitions or strategic investments;
- announcements of technological innovations relating to aerogels, thermal management and energy infrastructure insulation;
- results of operations or projections that vary from the expectations of securities analysts and investors;
- the periodic nature of our sales cycles, in particular for capital projects in the energy infrastructure market;
- our ability to develop, obtain regulatory clearance or approval for and market new and enhanced products on a timely basis;
- future sales of our common stock, including sales by our executive officers, directors and significant stockholders and their respective affiliates;
- announcements by third parties of significant claims or proceedings against us, including with regard to intellectual property and product liability;
- changes in accounting principles; and
- general U.S. and global economic conditions and other factors, including factors unrelated to our operating performance or the operating performance of our competitors.

Furthermore, the U.S. stock market has at times experienced extreme volatility that in some cases has been unrelated or disproportionate to the operating performance of particular companies. These broad market and industry fluctuations may adversely affect the market price of our common stock, regardless of our actual operating performance.

In the past, following periods of market volatility, stockholders have instituted securities class action litigation. If we become involved in securities litigation, it could have a substantial cost and divert resources and the attention of our senior management team from our business regardless of the outcome of such litigation.

***Securities analysts may not continue coverage of our common stock or may issue negative reports, which may have a negative impact on the market price of our common stock.***

The trading market for our common stock relies in part on the research and reports that industry or financial analysts publish about us or our business. Securities analysts may elect not to provide research coverage of our common stock. If securities analysts do not cover or continue to cover our common stock, the lack of research coverage may cause the market price of our common stock to decline. If one or more of the analysts who elects to cover us downgrades our stock, our stock price would likely decline substantially. If one or more of these analysts ceases coverage of us, we could lose visibility in the market, which in turn could cause our stock price to decline. In addition, rules mandated by the Sarbanes-Oxley Act and a global settlement reached in 2003 between the SEC, other regulatory agencies and a number of investment banks have led to a number of fundamental changes in how analysts are reviewed and compensated. In particular, many investment banking firms are required to contract with independent financial analysts for their stock research. It may be difficult for companies such as ours, with smaller market capitalizations, to attract independent financial analysts that will cover our common stock. This could have a negative effect on the market price of our stock.

***Our directors, officers and principal stockholders have significant voting power and may take actions that may not be in the best interests of our other stockholders.***

As of December 31, 2017, our executive officers, directors and principal stockholders and their affiliates collectively controlled approximately 20.6% of our outstanding shares of common stock. As a result, these stockholders, if they act together, may be able to control the management and affairs of our company and certain matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions. This concentration of ownership may have the effect of delaying or preventing a change of control and might adversely affect the market price of our common stock. This concentration of ownership may not be in the best interests of our other stockholders.

***Anti-takeover provisions in our restated certificate of incorporation and restated bylaws, and Delaware law, could delay or discourage a takeover.***

Anti-takeover provisions in our restated certificate of incorporation and restated bylaws and Delaware law may have the effect of deterring or delaying attempts by our stockholders to remove or replace management, engage in proxy contests and effect changes in control. The provisions of our charter documents include:

- procedures for advance notification of stockholder nominations and proposals;
- the inability of our stockholders to call a special meeting of the stockholders and the inability of our stockholders to act by written consent;
- the ability of our board of directors to create new directorships and to fill any vacancies on the board of directors;
- the ability of our board of directors to amend our restated bylaws without stockholder approval; and
- the ability of our board of directors to issue up to 5,000,000 shares of preferred stock without stockholder approval upon the terms and conditions and with the rights, privileges and preferences as our board of directors may determine.

In addition, as a Delaware corporation, we are subject to Delaware law, including Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years following the date that the stockholder became an interested stockholder unless certain specific requirements are met as set forth in Section 203. These provisions, alone or together, could have the effect of deterring or delaying changes in incumbent management, proxy contests or changes in control.

***Our restated certificate of incorporation designates a state or federal court located within the State of Delaware as the exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.***

Our restated certificate of incorporation provides that, subject to limited exceptions, a state or federal court located within the State of Delaware will be the exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (3) any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law, our restated certificate of incorporation or our restated bylaws, or (4) any other action asserting a claim against us that is governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our restated certificate of incorporation described above. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and employees. Alternatively, if a court were to find these provisions of our restated certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business and financial condition.

***Our shareholders may experience future dilution as a result of future equity offerings.***

In the future, we may offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock in order to raise additional capital. We cannot assure our shareholders that we will be able to sell shares or other securities in any other offering at a price per share that is equal to or greater than the price per share our shareholders paid for our shares. Investors purchasing shares or other securities in the future could have rights, preferences or privileges senior to those of our shareholders and our shareholders may experience dilution. Our shareholders may incur additional dilution upon the exercise of any outstanding stock options or warrants, the issuance of shares of restricted stock, the vesting of restricted stock units, or the issuance, vesting or exercise of other equity awards.

***We do not intend to pay cash dividends in the foreseeable future and, consequently, our shareholders' ability to achieve a return on your investment will depend on appreciation in the price of our common stock.***

We have never declared or paid cash dividends on our common stock and we do not intend to pay any cash dividends on our common stock in the foreseeable future. We currently expect to retain all available funds and any future earnings for use in the operation and expansion of our business. In addition, the terms of our revolving credit facility restrict our ability to pay dividends and any future credit facilities, loan agreements, debt instruments or other agreements may further restrict our ability to pay dividends. Payments of future dividends, if any, will be at the discretion of our board of directors after taking into account various factors, including our business, results of operations and financial condition, current and anticipated cash needs, plans for expansion and any legal or contractual limitations on our ability to pay dividends. As a result, capital appreciation, if any, of our common stock will be our shareholders' sole source of potential gain for the foreseeable future.

#### **CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS**

This report includes forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Exchange Act that relate to future events or our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to differ materially from any future results, levels of activity, performance or achievements expressed or implied by these forward-looking statements. Words such as, but not limited to, "believe," "expect," "anticipate," "estimate," "intend," "seek," "may," "plan," "potential," "predict," "project," "targets," "likely," "will," "would," "could," "should," "continue," and similar expressions or phrases, or the negative of those expressions or phrases, are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Although we believe that we have a reasonable basis for each forward-looking statement contained in this report, we caution you that these statements are based on our projections of the future that are subject to known and unknown risks and uncertainties and other factors that may cause our actual results, level of activity, performance or achievements expressed or implied by these forward-looking statements, to differ. The description of our Business set forth in Item 1, the Risk Factors set forth in this Item 1A and our Management's Discussion and Analysis of Financial Condition and Results of Operations set forth in Item 7 as well as other sections in this report, discuss some of the factors that could contribute to these differences. These forward-looking statements include, among other things, statements about:

- the expected future growth of the market for aerogel insulation and continued gain in market share, in particular in the energy infrastructure insulation market and other markets we target;
- our plans to invest approximately \$6.0 million in incremental manufacturing and operating expense and to add 49 employees during 2018;
- our expectation that our investment in incremental manufacturing and operating expense will restore long-term growth in our existing markets and develop new business opportunities;
- our plans to continue to develop and optimize aerogel products for applications within the building materials market and our plan to realize revenue from this market;
- our pursuit of high-value opportunities for our aerogel products within different segments of the global insulation market, including the building materials market, and our plans to leverage our aerogel technology platform to develop innovative, aerogel enhanced products for applications outside the global insulation market;
- our plans to focus additional resources to continue to grow our share of the energy infrastructure insulation market;
- our pursuit of and the expected greater adoption of our products in district heating systems, LNG production and storage, and power generation markets and our expectation that product revenue will be generated in large part by demand for insulation associated with scheduled plant shutdowns, or turnarounds, and other maintenance-related projects;
- our expectation that our products will be specified during the design phase in a growing number of new plant construction and capital expansion projects and our expectation that we will have an increasing percentage of our products sold for use in capital projects;
- our expectation that the growth in global energy demand will result in increased new-build and large capacity expansion projects, driving demand for our aerogel products;
- our plans to continue our strategy of working with innovative companies to target and penetrate additional market opportunities;
- our plans to develop strategic partnerships to facilitate market penetration beyond the energy infrastructure and building materials market, as well as the expected goals and priorities of such strategic partnerships;

- our belief that an adequate long-term supply of silica-precursor is available;
- our belief that our portfolio of patents, trade secrets and know-how presents a significant barrier to potential new entrants in the production of aerogel blanket insulation;
- our expectation that we will be successful in enforcing and defending our patents against competitors and that such patents are valid and enforceable, as well as our expectations about the costs and consequences of our current or potential future patent litigation and the potential for additional patent litigation;
- our belief that our products possess strong competitive advantages over traditional insulation materials, including the superior thermal performance and the thin, easy-to-use and durable blanket form of our products;
- our plans to expand capacity at our East Providence, Rhode Island manufacturing facility and our plans to construct a second manufacturing facility in Statesboro, Georgia;
- our expectation that expanded capacity in our East Providence, Rhode Island facility or the first phase of the first production line at the planned second manufacturing facility will become available or operational in a timely manner to support the long-term growth in demand we expect;
- our current estimate that the cost of the project to expand capacity in our East Providence, Rhode Island facility will range from \$15 million to \$20 million;
- our expectation that the project to expand capacity in our East Providence, Rhode Island facility will provide an additional annual nameplate capacity of 10 million square feet of aerogel blankets;
- our belief that we can finance the expansion of our existing manufacturing facility with our cash balance, anticipated cash flows from operations, local government grants, debt financings and potentially equity financings;
- our belief that our end-use customers will continue to invest in major energy infrastructure projects;
- our expectation that we will continue to sell our products in the building materials and other end markets;
- our expectation that we will develop, manufacture and sell new products and technologies through the strategic partnership with BASF and that our strategic partnership with BASF will facilitate our penetration of the building materials market;
- our current estimate that design, development and construction costs for this second manufacturing facility and its first production line, to be built in two phases, will range from \$120 million to \$130 million;
- our expectation that our planned second manufacturing facility and its first production line will provide an additional annual nameplate capacity of 40 million square feet of aerogel blankets, and that the plant site, layout and design will support future development of two additional similar production lines;
- our belief that we can finance our planned second manufacturing facility and its first production line with anticipated cash flows from operations, local government grants, debt financings and potentially equity financings;
- our belief that the potential for significant technological innovation in traditional insulation materials is limited and that new high-performance materials will be required to meet evolving market requirements for energy efficient insulations systems;
- our belief that our aerogel products and manufacturing processes are proprietary and that we can protect our patents, trade secrets and know-how associated therewith;
- our belief that we can continue to improve the cost efficiency of our manufacturing process, that our current expansion plans offer attractive returns on incremental invested capital, and that we will focus our development efforts on new products and next generation technology with application in new, high value market segments;
- our belief that we will have opportunities to address additional high value applications in the estimated \$3.1 billion global insulation market, and that we are well positioned to leverage a decade's worth of research and development to design and commercialize disruptive aerogel products for a wide array of new markets;
- our belief that our products have the lowest cost on a fully-installed basis or offer significant life-cycle cost savings in energy infrastructure and certain other applications as compared to traditional insulation materials;
- our plans to continue to expand our global sales force and distribution network to support anticipated growth in customers and demand for our products and our plans to seek to promote greater enterprise-wide utilization of our products by existing end-use customers;



- our expectation to continue to hire a significant number of employees in order to support our anticipated growth, and that in the long-term we will continue to increase investment in research, development and engineering personnel, projects and infrastructure in support of efforts to develop new products, technologies and markets;
- our expectations about future revenues, expenses, gross profit, net loss, loss per share and Adjusted EBITDA, sources and uses of cash, capital requirements and the sufficiency of our existing cash balance and available credit;
- our expectations that most of our revenue will continue to come from a relatively small number of customers for the foreseeable future;
- our expectations of long-term revenue growth, with increasing levels of gross profit and improved cash flows from operations and our expectations that we will incur significant capital expenditures related to the expansion of our manufacturing capacity to support this expected long term growth in demand;
- our expectations about the impact of new accounting pronouncements on our consolidated financial statements and related disclosures;
- our belief that our experienced and dedicated leadership team will provide us with a competitive advantage in the industry;
- the expected future development of new aerogel technologies; and
- our expectations about limitations of net operating losses.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important cautionary statements in this report, particularly in the Risk Factors set forth in Item 1A of this Annual Report on Form 10-K, that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.

You should read this report and the documents that we reference in this report and have filed as exhibits to this report completely and with the understanding that our actual future results may be materially different from what we expect. The forward-looking statements contained in this report are made as of the date of this report, and we do not assume, and specifically disclaim, any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise.

**Item 1B. UNRESOLVED STAFF COMMENTS**

None.

**Item 2. PROPERTIES**

Our corporate headquarters are located in Northborough, Massachusetts, where we occupy approximately 51,650 square feet under a lease expiring on December 31, 2026. We also own an approximately 143,000 square foot manufacturing facility in East Providence, Rhode Island. In addition, we lease a 10,500 square foot facility, a 24,000 square foot facility and a 128,000 square foot facility in East Providence, Rhode Island, which leases expire on March 31, 2021, March 31, 2021 and March 31, 2019, respectively. We also intend to construct a second manufacturing facility to be located in Statesboro, Georgia.

**Item 3. LEGAL PROCEEDINGS**

In May 2016, we filed a complaint for patent infringement against Nano and Alison in the ITC. The ITC complaint alleged that these two China-based companies engaged in unfair trade practices by importing aerogel products in the United States that infringed, and/or are manufactured by processes that infringe, several of the Company's patents in violation of Section 337 of the Tariff Act. In the ITC complaint, we sought exclusion orders from the ITC that direct the United States Customs and Border Protection to stop the importation of these infringing products. In June 2016, the ITC instituted an investigation based on our complaint. In September 2017, the ALJ presiding over the ITC investigation issued an Initial Determination finding that Alison and Nano infringed our patents relating to aerogel insulation and/or the methods of manufacturing aerogel insulation. As part of the Initial Determination, the ALJ found that Alison and Nano infringed all the patent claims asserted against each of them across the three asserted patents and that Alison and Nano failed to prove that the asserted claims were invalid. The ALJ also recommended a limited exclusion order as a remedy to prevent the importation of infringing aerogel products into the United States. In February 2018, the ITC issued its final determination confirming the ALJ's infringement and validity determinations except with respect to one dependent product claim where the ITC found the claim not infringing. The ITC also revised some of the ALJ's claim constructions. However, the ITC affirmed

that Alison and Nano each violated Section 337 of the Tariff Act and issued a limited exclusion order prohibiting importation of infringing aerogel insulation products manufactured by Alison and Nano. The exclusion order, which will be enforced by the United States Customs and Border Protection, is subject to a 60-day presidential review period, but is otherwise expected to be in full effect starting on April 6, 2018. Upon a request by a party, the final determination may be appealed to the United States Court of Appeals for the Federal Circuit. In addition to Respondents' contention at the ITC that the asserted patents were invalid, Alison also filed petitions with the USPTO requesting Inter-Partes Review to cancel certain claims in three of the Company's manufacturing process patents and one product patent. A three-member panel of Administrative Patent Judges at the USPTO denied all of Alison's petitions to institute Inter-Partes Review challenging the validity of these Aspen patents. Alison also filed similar requests with the SIPO seeking to invalidate two of our Chinese manufacturing process patents and two of our Chinese product patents. After the conclusion of the oral proceedings and before any decision issued by the SIPO, Alison withdrew all of its requests for invalidation of our Chinese patents.

In April 2016, we also filed a patent infringement suit at the District Court in Mannheim, Germany against the Respondents and two European resellers asserting their infringement of one of our German patents. We subsequently asserted infringement of another three patents against Nano and a European reseller of Alison's products at the Mannheim court. We have since settled with one European reseller in exchange for a commitment not to procure infringing products and cooperation with our case. In January 2018, the court issued a series of judgments by acknowledgement (German, "Anerkenntnisurteil") finding the second reseller, Hiltex, liable for infringement and also issued injunctions against Hiltex. The judgments resulted from a settlement agreement in which Hiltex agreed not to resell the infringing products in Europe where at least one of the asserted patents are active. The litigation against Alison and Nano remains ongoing. Nano also initiated nullity actions in German Federal Patent Court against three of our asserted German manufacturing process patents. Alison likewise filed an opposition to one of the asserted patents at the EPO and also initiated nullity action against two other patents. Nano also filed an opposition against the same patent at the EPO.

Due to their nature, it is difficult to predict the outcome or the costs involved in any litigation or administrative proceedings, including any appeals process. Furthermore, the Respondents may have significant resources and interest to litigate and therefore, these litigation matters could be protracted and may ultimately involve significant legal expenses. In addition to the foregoing, we have been and may be from time to time party to other legal proceedings that arise in the ordinary course of business and to other patent enforcement actions to assert our patent rights.

**Item 4. MINE SAFETY DISCLOSURES**

Not applicable.

## PART II

### Item 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

#### Market Information and Dividend Policy

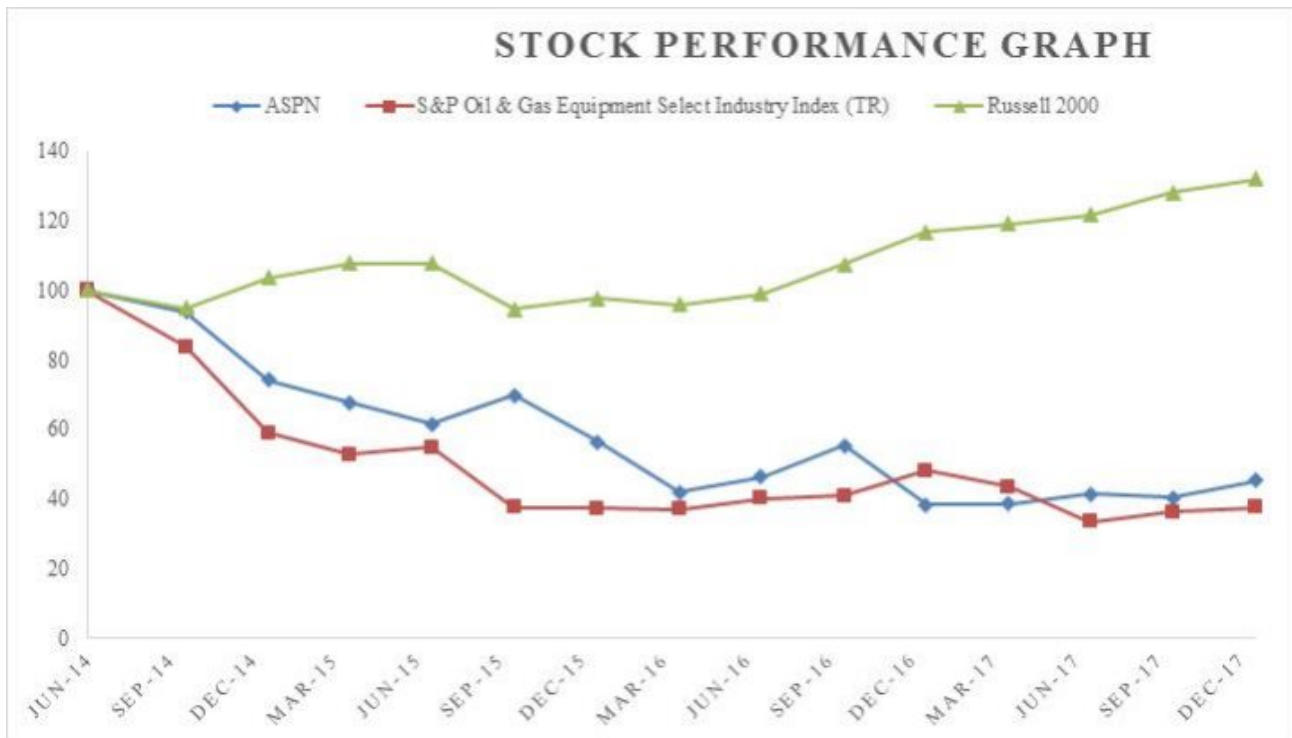
Our common stock is trading on The New York Stock Exchange, or NYSE, under the symbol "ASPN." The following table sets forth, for the period indicated, the high and low sales prices of our common stock as reported by the NYSE:

	2017	High	Low
First Quarter		\$ 4.86	\$ 3.84
Second Quarter		\$ 4.62	\$ 3.95
Third Quarter		\$ 4.90	\$ 3.99
Fourth Quarter		\$ 5.14	\$ 4.12
	2016		
First Quarter		\$ 6.58	\$ 3.38
Second Quarter		\$ 5.39	\$ 3.91
Third Quarter		\$ 6.29	\$ 4.42
Fourth Quarter		\$ 6.71	\$ 3.61

As of January 31, 2018, there were 63 stockholders of record of our common stock. We have not paid dividends to our stockholders since our inception and we do not plan to pay cash dividends in the foreseeable future. We currently intend to retain earnings, if any, to finance the development and expansion of our business.

## Stock Performance Graph

The following graph and table compare the cumulative total stockholder return for our common stock during the period from June 13, 2014 (the date our common stock commenced trading on the NYSE) through December 31, 2017 in comparison to the S&P Oil & Gas Equipment Select Industry Index and the Russell 2000. The graph and the table below assume (i) that \$100 was invested at the market close on June 13, 2014 in the common stock of Aspen Aerogels, Inc., the S&P Oil & Gas Equipment Select Industry Index and the Russell 2000, and (ii) reinvestment of dividends. The comparisons in the graph and table are not intended to be indicative of the possible future performance of our common stock.



	<u>6/13/2014</u>	<u>Jun-14</u>	<u>Sep-14</u>	<u>Dec-14</u>	<u>Mar-15</u>	<u>Jun-15</u>	<u>Sep-15</u>	<u>Dec-15</u>
Aspen Aerogels, Inc.	100.00	102.79	93.77	74.14	67.72	61.58	69.77	56.47
S&P Oil & Gas Equipment Select Industry Index (TR)	100.00	102.43	83.68	59.08	52.83	54.98	37.68	37.42
Russell 2000	100.00	102.60	94.75	103.61	107.75	107.85	94.67	97.70
	<u>Mar-16</u>	<u>Jun-16</u>	<u>Sep-16</u>	<u>Dec-16</u>	<u>Mar-17</u>	<u>Jun-17</u>	<u>Sep-17</u>	<u>Dec-17</u>
Aspen Aerogels, Inc.	41.86	46.23	55.44	38.42	38.60	41.40	40.47	45.40
S&P Oil & Gas Equipment Select Industry Index (TR)	37.03	40.22	40.95	48.16	43.40	33.53	36.34	37.65
Russell 2000	95.82	99.07	107.65	116.72	119.20	121.73	36.34	132.07

The performance graph and table above are being furnished and shall not be deemed “filed” for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities under that section, nor shall it be deemed incorporated by reference into any registration statement or other filing under the Securities Act or the Exchange Act, except as shall be expressly set forth by specific reference in such filing.

## Unregistered Sales of Equity Securities and Use of Proceeds

(a) *Unregistered Sales of Equity Securities* . Not applicable.

(b) *Use of Proceeds from Initial Public Offering of Common Stock* . We registered shares of our common stock in connection with our initial public offering pursuant to a registration statement on Form S-1 (File No. 333-195523), which was declared effective by the SEC on June 12, 2014, and a registration statement on Form S-1 (File No. 333-196719) filed pursuant to Rule 462(b) of the Securities Act.

We received aggregate net proceeds from the offering of approximately \$74.7 million, after deducting \$4.3 million of underwriting discounts and approximately \$3.5 million of offering expenses.

As of December 31, 2017, we used \$19.8 million of the net proceeds of the offering to repay all amounts outstanding under our subordinated notes and our revolving credit facility; \$31.0 million of the net proceeds of the offering for capital expenditures related to our third production line in East Providence, Rhode Island; and \$7.2 million of the net proceeds of the offering for the design of our planned second manufacturing facility in Statesboro, Georgia. The remainder of the net proceeds are held in a deposit account and money market account with a major financial institution in North America. We have broad discretion in the use of the net proceeds from our initial public offering and could spend the proceeds in ways that do not improve our results of operations or enhance the value of our stock. There has been no material change in our planned use of the balance of the net proceeds from the offering as described in our final prospectus filed with the SEC on June 16, 2014.

(c) *Purchases of Equity Securities By the Issuer and Affiliated Purchasers* . We did not repurchase any of our equity securities during the year ended December 31, 2017.

## **Item 6. SELECTED FINANCIAL DATA**

The following table sets forth our selected consolidated financial data for the periods, and as of the dates, indicated. You should read the following selected consolidated financial data in conjunction with our consolidated financial statements and the related notes thereto included elsewhere in this Annual Report on Form 10-K and the “Management’s Discussion and Analysis of Financial Condition and Results of Operations” section of this Annual Report on Form 10-K.

We derived the consolidated statement of operations data for the years ended December 31, 2017, 2016 and 2015, and the consolidated balance sheet data as of December 31, 2017 and 2016, from our audited consolidated financial statements and the related notes thereto included elsewhere in this Annual Report, which financial statements have been audited by KPMG LLP, independent registered public accounting firm. We derived the consolidated statement of operations data for the fiscal years ended December 31, 2014 and 2013, and the consolidated balance sheet data as of December 31, 2015, 2014 and 2013, from our audited consolidated financial statements and the related notes thereto that are not included in this Annual Report, which financial statements have been audited by KPMG LLP, independent registered public accounting firm.

	Year Ended December 31,				
	2017	2016	2015	2014	2013
(\$ in thousands, except share and per share data)					
<b>Consolidated statements of operations data:</b>					
Revenue:					
Product	\$ 109,590	\$ 115,490	\$ 120,532	\$ 99,259	\$ 82,057
Research services	2,041	2,248	1,986	3,140	4,037
Total revenue	<u>111,631</u>	<u>117,738</u>	<u>122,518</u>	<u>102,399</u>	<u>86,094</u>
Cost of revenue:					
Product	92,052	93,123	96,865	83,677	73,399
Research services	908	1,304	1,005	1,642	1,964
Gross profit	<u>18,671</u>	<u>23,311</u>	<u>24,648</u>	<u>17,080</u>	<u>10,731</u>
Operating expenses:					
Research and development	6,180	5,306	5,253	5,980	5,159
Sales and marketing	12,604	11,810	10,562	10,290	9,271
General and administrative	19,023	17,415	15,068	16,853	12,833
Write-off of construction in progress	—	—	—	—	3,440
Total operating expenses	<u>37,807</u>	<u>34,531</u>	<u>30,883</u>	<u>33,123</u>	<u>30,703</u>
Loss from operations	<u>(19,136)</u>	<u>(11,220)</u>	<u>(6,235)</u>	<u>(16,043)</u>	<u>(19,972)</u>
Other expense, net:					
Interest expense, net	(185)	(147)	(182)	(50,281)	(30,599)
Gain on extinguishment of convertible notes	—	—	—	—	8,898
Loss on exchange of convertible notes	—	—	—	—	(5,697)
Postponed financing costs	—	(656)	—	—	—
Costs associated with postponed public offering	—	—	—	—	(241)
Total other expense, net	<u>(185)</u>	<u>(803)</u>	<u>(182)</u>	<u>(50,281)</u>	<u>(27,639)</u>
Net loss	<u>(19,321)</u>	<u>(12,023)</u>	<u>(6,417)</u>	<u>(66,324)</u>	<u>(47,611)</u>
Accretion (deemed dividends) on preferred stock	—	—	—	—	(996)
Extinguishment of redeemable feature for convertible preferred stock	—	—	—	—	86,161
Earnings attributable to preferred stock shareholders	—	—	—	—	(36,216)
Net income (loss) attributable to common stockholders	<u>\$ (19,321)</u>	<u>\$ (12,023)</u>	<u>\$ (6,417)</u>	<u>\$ (66,324)</u>	<u>\$ 1,338</u>
<b>Per share data:</b>					
Net income (loss) attributable to common stockholders per share:					
Basic	<u>\$ (0.83)</u>	<u>\$ (0.52)</u>	<u>\$ (0.28)</u>	<u>\$ (5.37)</u>	<u>\$ 426.52</u>
Diluted	<u>\$ (0.83)</u>	<u>\$ (0.52)</u>	<u>\$ (0.28)</u>	<u>\$ (5.37)</u>	<u>\$ 410.56</u>
Weighted-average common shares outstanding:					
Basic	<u>23,390,235</u>	<u>23,139,807</u>	<u>22,986,931</u>	<u>12,349,456</u>	<u>3,137</u>
Diluted	<u>23,390,235</u>	<u>23,139,807</u>	<u>22,986,931</u>	<u>12,349,456</u>	<u>3,259</u>

	As of December 31,				
	2017	2016	2015	2014	2013
<b>Consolidated balance sheet data:</b>					
Cash and cash equivalents	\$ 10,694	\$ 18,086	\$ 32,804	\$ 49,719	\$ 1,574
Working capital (1)	26,093	32,056	44,238	53,168	(3,370)
Total assets	123,815	134,669	140,074	145,043	90,233
Total debt	3,750	39	107	165	138,555
Total stockholders' equity (deficit)	100,943	115,564	122,474	123,716	(61,966)

(1) Working capital means current assets minus current liabilities.

## Item 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

*The following discussion of our financial condition and results of operations should be read in conjunction with the "Selected Financial Data" and our consolidated financial statements and the related notes thereto included in this Annual Report on Form 10-K. In addition to historical information, some of the information contained in the following discussion and analysis or set forth elsewhere in this report, including information with respect to our plans and strategy for our business, includes forward looking information that involves risks, uncertainties and assumptions. You should read the Risk Factors set forth in Item 1A of this Annual Report on Form 10-K for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis. Our actual results and the timing of events could differ materially from those anticipated by these forward looking statements.*

### Overview

We design, develop and manufacture innovative, high-performance aerogel insulation used primarily in the energy infrastructure and building materials markets. We believe our aerogel blankets deliver the best thermal performance of any widely used insulation product available on the market today and provide a combination of performance attributes unmatched by traditional insulation materials. Our end-use customers select our products where thermal performance is critical and to save money, improve resource efficiency, preserve operating assets and protect workers.

Our insulation is used by oil producers and the owners and operators of refineries, petrochemical plants, liquefied natural gas facilities, power generating assets and other energy infrastructure. Our Pyrogel and Cryogel product lines have undergone rigorous technical validation by industry leading end-users and achieved significant market adoption. We also derive product revenue from the building materials and other end markets. Customers in these markets use our products for applications as diverse as wall systems, military and commercial aircraft, trains, buses, appliances, apparel, footwear and outdoor gear.

We generate product revenue through the sale of our line of aerogel blankets. We market and sell our products primarily through a sales force based in North America, Europe and Asia. The efforts of our sales force are supported by a small number of sales consultants with extensive knowledge of a particular market or region. Our sales force is responsible for establishing and maintaining customer and partner relationships, delivering highly technical information and ensuring high-quality customer service.

Our salespeople work directly with end-use customers and engineering firms to promote the qualification, specification and acceptance of our products. We also rely on an existing and well-established channel of qualified insulation distributors and contractors in more than 40 countries around the world to ensure rapid delivery of our products and strong end-user support. Our salespeople also work to educate insulation contractors about the technical and operating cost advantages of our aerogel blankets.

We also perform research services under contracts with various agencies of the U.S. government, including the Department of Defense and the Department of Energy, and other institutions. Research performed under contract with government agencies and other institutions enables us to develop and leverage technologies into broader commercial applications.

We manufacture our products using our proprietary technology at our facility in East Providence, Rhode Island. We commenced operation of a third production line in the East Providence facility during 2015 which increased our annual nameplate capacity to 50 million square feet of aerogel blankets. We have initiated a series of projects designed to increase this nameplate capacity to 60 million square feet of aerogel blankets by the end of 2020. We have also completed the design and engineering of a first line in a planned second manufacturing facility to be located in Statesboro, Georgia supported by a package of incentives from the State of Georgia and local governmental authorities. We have elected to delay construction of the Statesboro facility to better align the timing of this capacity expansion with our assessment of future demand.

We have entered into a strategic partnership with BASF to develop and commercialize products for the building materials and other markets. The strategic partnership includes a supply agreement governing the sale of our Spaceloft A2 product to BASF and a joint development agreement targeting innovative products and technologies. Pursuant to the Supply Agreement, BASF may, in its sole discretion, make prepayments to the Company in the aggregate amount of up to \$22 million in support of our capacity expansion plans, our process improvement initiatives and our new business development efforts. BASF has agreed to make a prepayment to us in the amount of \$5 million in two installments during 2018. The 2018 prepayment will be either credited against amounts invoiced to BASF for Spaceloft A2 or repaid by us to BASF on or after December 31, 2021.

In July 2017, we announced the launch of a new product, Pyrogel HPS, a high-temperature aerogel blanket engineered to provide superior thermal conductivity and economic performance at service temperatures between 400°C and 650°C.

Our revenue for the year ended December 31, 2017 was \$111.6 million, which represented a decrease of 5% from the year ended December 31, 2016. Net loss for the year ended December 31, 2017 was \$19.3 million and net loss per share was \$0.83.

### Key Metrics and Non-GAAP Financial Measures

We regularly review a number of metrics, including the following key metrics, to evaluate our business, measure our performance, identify trends affecting our business, formulate financial projections and make strategic decisions.

#### Square Foot Operating Metric

We price our product and measure our product shipments in square feet. We estimate our annual nameplate capacity was 50 million square feet of aerogel blankets at December 31, 2017. We believe the square foot operating metric allows us and our investors to measure our manufacturing capacity and product shipments on a uniform and consistent basis. The following chart sets forth product shipments associated with recognized revenue in square feet for the periods presented:

	Year Ended December 31,		
	2017	2016	2015
	(Square feet in thousands)		
Product shipments in square feet	37,519	44,286	42,246

#### Adjusted EBITDA

We use Adjusted EBITDA, a non-GAAP financial measure, as a means to assess our operating performance. We define Adjusted EBITDA as net income (loss) before interest expense, taxes, depreciation, amortization, stock-based compensation expense and other items, which occur from time to time, that we do not believe are indicative of our core operating performance. Adjusted EBITDA is a supplemental measure of our performance that is not presented in accordance with U.S. GAAP. Adjusted EBITDA should not be considered as an alternative to net income (loss) or any other measure of financial performance calculated and presented in accordance with U.S. GAAP. In addition, our definition and presentation of Adjusted EBITDA may not be comparable to similarly titled measures presented by other companies.

We use Adjusted EBITDA:

- as a measure of operating performance because it does not include the impact of items that we do not consider indicative of our core operating performance;
- for planning purposes, including the preparation of our annual operating budget,
- to allocate resources to enhance the financial performance of our business; and
- as a performance measure used under our bonus plan.

We also believe that the presentation of Adjusted EBITDA provides useful information to investors with respect to our results of operations and in assessing the performance and value of our business. Various measures of EBITDA are widely used by investors to measure a company's operating performance without regard to items that can vary substantially from company to company depending upon financing and accounting methods, book values of assets, capital structures and the methods by which assets were acquired.



Although measures similar to Adjusted EBITDA are frequently used by investors and securities analysts in their evaluation of companies, we understand that Adjusted EBITDA has limitations as an analytical tool, and you should not consider it in isolation or as a substitute for net income, income from operations, net cash provided by (used in) operating activities or an analysis of our results of operations as reported under U.S. GAAP. Some of these limitations are:

- Adjusted EBITDA does not reflect our historical cash expenditures or future requirements for capital expenditures or other contractual commitments;
- Adjusted EBITDA does not reflect changes in, or cash requirements for, our working capital needs;
- Adjusted EBITDA does not reflect stock-based compensation expense;
- Adjusted EBITDA does not reflect our tax expense or cash requirements to pay our income taxes;
- Adjusted EBITDA does not reflect our interest expense, or the cash requirements necessary to service interest or principal payments on our debt;
- Although depreciation, amortization and impairment charges are non-cash charges, the assets being depreciated, amortized or impaired will often have to be replaced in the future, and Adjusted EBITDA does not reflect any cash requirements for these replacements; and
- Other companies in our industry may calculate EBITDA or Adjusted EBITDA differently than we do, limiting their usefulness as a comparative measure.

Because of these limitations, our Adjusted EBITDA should not be considered as a measure of discretionary cash available to us to reinvest in the growth of our business or as a measure of cash available for us to meet our obligations.

To properly and prudently evaluate our business, we encourage you to review the GAAP financial statements included elsewhere in this Annual Report on Form 10-K, and not to rely on any single financial measure to evaluate our business.

The following table presents a reconciliation of net loss, the most directly comparable GAAP measure, to Adjusted EBITDA for the years presented:

	Year Ended December 31,		
	2017	2016	2015
	(\$ in thousands)		
Net loss	\$ (19,321)	\$ (12,023)	\$ (6,417)
Depreciation and amortization	10,753	9,853	9,887
Stock-based compensation (1)	5,091	5,313	5,413
Interest expense, net	185	147	182
Postponed financing costs	—	656	—
Adjusted EBITDA	<u>\$ (3,292)</u>	<u>\$ 3,946</u>	<u>\$ 9,065</u>

- (1) Represents non-cash stock-based compensation related to vesting and modifications of stock option grants, vesting of restricted stock units and vesting and modification of restricted common stock.

The following table presents a reconciliation of net loss, the most directly comparable GAAP measure, to Adjusted EBITDA for the quarters presented:

	Three months ended				Three months ended			
	2017				2016			
	March 31	June 30	Sept. 30	Dec. 31	March 31	June 30	Sept. 30	Dec. 31
Net loss	\$ (9,078)	\$ (5,472)	\$ (3,088)	\$ (1,683)	\$ (1,797)	\$ (1,387)	\$ (3,097)	\$ (5,742)
Depreciation and amortization	2,676	2,630	2,726	2,721	2,410	2,416	2,472	2,555
Stock-based compensation (1)	1,244	1,374	1,364	1,109	1,370	1,433	1,474	1,036
Interest expense, net	26	39	58	62	39	39	37	32
Postponed financing costs	—	—	—	—	—	—	656	—
Adjusted EBITDA	<u>\$ (5,132)</u>	<u>\$ (1,429)</u>	<u>\$ 1,060</u>	<u>\$ 2,209</u>	<u>\$ 2,022</u>	<u>\$ 2,501</u>	<u>\$ 1,542</u>	<u>\$ (2,119)</u>

- (1) Represents non-cash stock-based compensation related to vesting and modifications of stock option grants, vesting of restricted stock units and vesting and modification of restricted common stock.

Our financial performance, including such measures as net income (loss), earnings per share and Adjusted EBITDA, are affected by a number of factors including volume and mix of aerogel products sold, average selling prices, our material and manufacturing costs, the costs associated with and timing of capacity expansions and start-up of additional production capacity, and the amount and timing of operating expenses, including patent enforcement costs. As we build out our manufacturing capacity in new facilities in the longer term, we expect increased manufacturing expenses will periodically have a negative impact on net income (loss), earnings per share and Adjusted EBITDA, but will set the framework for improved performance in the long term. Accordingly, we expect that our net income (loss), earnings per share and Adjusted EBITDA will vary from period to period, in particular as and when we expand our manufacturing capacity in new facilities.

As a result of the conclusion of a multiyear petrochemical project with Reliance Industries Limited and an expected decline in the volume of subsea projects, which together comprised 19% of our product revenue during 2017, we may experience a decrease in revenue, an increase in net loss and loss per share and a decrease in Adjusted EBITDA during 2018. In addition, we plan to increase investment in new initiatives and personnel by approximately \$6.0 million during 2018 with the objective of restoring long-term growth in our existing markets and developing new business opportunities. This investment is associated, in large part, with our plan to add 49 new employees to our team during the year. As a result of a planned increase in manufacturing and operating expenses associated with these new initiatives and personnel, we may experience an increase in net loss and loss per share and a decrease in Adjusted EBITDA during 2018 even in the event that we experience an increase in revenue during the year.

### ***Emerging Growth Company Status***

The JOBS Act permits an “emerging growth company” such as us to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies. We have opted out of this provision and, as a result, we comply with new or revised accounting standards as required when they are adopted. This decision to opt out of the extended transition period under the JOBS Act is irrevocable.

### **Components of Our Results of Operations**

#### ***Revenue***

We recognize product revenue from the sale of our line of aerogel products and research services revenue from the provision of services under contracts with various agencies of the U.S. government and other institutions. Product revenue is recognized upon transfer of title and risk of loss, which is upon shipment or delivery. The following table sets forth the total revenue for the periods presented:

	<b>Year Ended December 31,</b>		
	<b>2017</b>	<b>2016</b>	<b>2015</b>
	<b>(\$ in thousands)</b>		
Revenue:			
Product	\$ 109,590	\$ 115,490	\$ 120,532
Research services	2,041	2,248	1,986
Total revenue	<u>\$ 111,631</u>	<u>\$ 117,738</u>	<u>\$ 122,518</u>

Product revenue accounted for 98% of total revenue for each of the years ended December 31, 2017, 2016 and 2015. In the near term, we may experience a decrease in product revenue due to an anticipated decrease in project related revenue in the subsea market and as a result of the conclusion of the major petrochemical project with Reliance Industries. However, we expect a resumption of growth in product revenue in the long term due to increasing market adoption of our line of aerogel blankets in the energy infrastructure market, particularly in the power generation, LNG and district energy markets, and increasing penetration of new markets, including the building materials market. We expect that research services revenue will remain a small percentage of total revenue due to limitations on our eligibility to receive contract awards under federal guidelines.

A substantial majority of our revenue is generated from a limited number of direct customers, including distributors, contractors, OEMs, partners and end-use customers. Our 10 largest customers accounted for approximately 69% of our total revenue during the year ended December 31, 2017, and we expect that most of our revenue will continue to come from a relatively small number of customers for the foreseeable future. In 2017, sales to Distribution International, Inc. and TechnipFMC represented 15% and 12% of our total revenue, respectively. In 2016, sales to Reliance Industries Limited and Distribution International, Inc. represented 25% and 15% of our total revenue, respectively. In 2015, sales to Distribution International, Inc. and Reliance Industries Limited represented 14% and 12% of total revenue, respectively. For each of the noted periods, there were no other customers that represented 10% or more of our total revenues.

We conduct business across the globe and a substantial portion of our revenue is generated outside of the United States. Total revenue from outside of the United States, based on shipment destination, amounted to \$60.2 million, or 54% of our total revenue, \$ 82.0 million, or 70 % of our total revenue, and \$ 78.0 million or 64 % of our total revenue, in the years ended December 31, 2017, 2016 and 2015 , respectively.

### ***Cost of Revenue***

Cost of product revenue consists primarily of materials and manufacturing expense, including labor, utilities, maintenance expense and depreciation on manufacturing assets. Cost of product revenue is recorded when the related product revenue is recognized. Cost of product revenue also includes stock-based compensation of manufacturing employees and shipping costs.

Material is our most significant component of cost of product revenue and includes fibrous batting, silica materials and additives. Material costs as a percentage of product revenue were 45%, 41% and 45% for the years ended December 31, 2017, 2016 and 2015, respectively.

Material costs as a percentage of product revenue vary from product to product due to differences in average selling prices, material requirements, product thicknesses and manufacturing yields. In addition, we provide warranties for our products and record the estimated cost within cost of sales in the period that the related revenue is recorded. As a result, material costs as a percentage of revenue will vary from period to period due to changes in the mix of aerogel products sold or the estimated cost of warranties. However, in general, we expect material costs in the aggregate to decline as a percentage of revenue as we seek to achieve higher selling prices, material sourcing improvements, quality improvements and manufacturing yield enhancements for our aerogel products.

Manufacturing expense is also a significant component of cost of revenue. Manufacturing expense as a percentage of product revenue was 39%, 39% and 36% for the years ended December 31, 2017, 2016 and 2015, respectively. During 2017, product revenue and manufacturing expense each declined by 5%. As a result, manufacturing expense as a percentage of product revenue remained flat to the comparable period in 2016. The decrease in manufacturing expense in absolute dollars during 2017 reflected a reduction in manufacturing personnel and expense associated with our plan to decrease output during the period to control inventory balances.

As we increase manufacturing capacity in our East Providence, Rhode Island facility through 2020 and, over time, through the anticipated construction, operation and expansion of a second manufacturing facility, we expect manufacturing expense as a percentage of product revenue will increase following each such expansion but will decrease in the long-term with increased revenues supported by the effect of completed capacity expansions.

We expect that cost of product revenue in absolute dollars and as a percentage of product revenue will decrease during 2018 versus 2017. The projected decrease in cost of product revenue in absolute dollars and as a percentage of product revenue reflects the impact of a planned increase in manufacturing output and an expected favorable mix of products sold, offset, in part, by a planned increase in personnel and expense in support of our capacity expansion and growth initiatives.

Cost of research services revenue consists of direct labor costs of research personnel engaged in the contract research, third-party consulting expense, and associated direct material costs. This cost of revenue also includes overhead expenses associated with project resources, development tools and supplies. Cost of research services revenue is recorded when the related research services revenue is recognized.

### ***Gross Profit***

Our gross profit as a percentage of revenue is affected by a number of factors, including the volume of aerogel products produced and sold, the mix of aerogel products sold, average selling prices, our material and manufacturing costs, realized capacity utilization and the costs associated with expansions and start-up of production capacity. Accordingly, we expect our gross profit in absolute dollars and as a percentage of revenue to vary significantly from period to period. As and when we build out our manufacturing capacity, we expect increased manufacturing expenses will periodically have a negative impact on gross profit in the periods following any such expansion.

As a result of the conclusion of a multiyear petrochemical project with Reliance Industries Limited and an expected decrease in the volume of subsea projects, which together comprised 19% of our product revenue during 2017, we may experience a decrease in revenue and an associated decrease in gross profit in absolute dollars and as a percentage of revenue during 2018. In addition, we plan to increase investment in manufacturing personnel and expenses during 2018 in support of our objective to increase the capacity of our East Providence manufacturing facility, operational improvement initiatives and our new business development efforts. As a result of this planned increase in manufacturing expense, we may experience a decrease in gross profit even in the event that we experience an increase in revenue during the year.

However, in the longer term, we expect gross profit to improve as a percentage of revenue due to expected increases in manufacturing productivity and production volumes, supported by expected capacity expansions, improvements in manufacturing yields and realization of material purchasing efficiencies.

### ***Operating Expenses***

Operating expenses consist of research and development, sales and marketing, and general and administrative expenses. Operating expenses include personnel costs, legal fees, professional fees, service fees, insurance premiums, travel expense, facilities related costs and other costs and fees. The largest component of our operating expenses is personnel costs, consisting of salaries, benefits, incentive compensation and stock-based compensation. In any particular period, the timing and extent of personnel additions or reductions, legal activities, including patent enforcement actions, marketing programs, research efforts and a range of similar activities or actions could materially affect our operating expenses, both in absolute dollars and as a percentage of revenue.

We plan to increase investment in new initiatives and personnel during 2018 with the objective of restoring long-term growth in our existing markets and to develop new business opportunities. As a result of this planned increase in operating expenses for new initiatives and personnel, we expect to experience an increase in operating expenses both in absolute dollars and as a percentage of revenue during 2018.

### ***Research and Development Expenses***

Research and development expenses consist primarily of expenses for personnel engaged in the development of next generation aerogel compositions, form factors and manufacturing technologies. These expenses also include testing services, prototype expenses, consulting services, equipment depreciation, facilities costs and related overhead. We expense research and development costs as incurred. We expect to continue to devote substantial resources to the development of new aerogel technologies. We believe that these investments are necessary to maintain and improve our competitive position. We expect to continue to invest in research and engineering personnel and the infrastructure required in support of their efforts. While we expect that our research and development expenses will increase in absolute dollars but decrease as a percentage of revenue in the longer term, in the nearer term we expect such expenses will increase as a percentage of revenue.

### ***Sales and Marketing Expenses***

Sales and marketing expenses consist primarily of personnel costs, incentive compensation, marketing programs, travel and related costs, consulting expenses and facilities related costs. We plan to expand our sales force and sales consultants globally to drive anticipated growth in customers and demand for our products. While we expect that sales and marketing expenses will increase in absolute dollars but decrease as a percentage of revenue in the longer-term, in the nearer term we expect such expenses will increase as a percentage of revenue.

### ***General and Administrative Expenses***

General and administrative expenses consist primarily of personnel costs, legal expenses, consulting and professional services, audit and tax consulting costs, and expenses for our executive, finance, legal, human resources and information technology organizations. General and administrative expenses have increased as we have incurred additional costs related to operating as a publicly-traded company, which include costs of compliance with securities, corporate governance and related laws and regulations, investor relations expenses, increased insurance premiums, including director and officer insurance, and increased audit and legal fees. In addition, we expect our general and administrative expenses to increase as we add general and administrative personnel to support the anticipated growth of our business and continued expansion of our manufacturing operations. We also expect that the patent enforcement actions, described in more detail under "Legal Proceedings" in Part I, Item 3 of this Annual Report on Form 10-K, if protracted, could result in significant legal expense over the medium to long-term. During 2018, we expect general and administrative expense will decrease both in absolute dollars and as a percentage of revenue due to an anticipated reduction in patent enforcement costs. In the longer term, however, we expect that general and administrative expenses will increase in absolute dollars but continue to decline as a percentage of revenue.

### ***Other Expense, Net***

For the year ended December 31, 2017, other expense, net consisted primarily of fees and interest expense related to our revolving credit facility. For the year ended December 31, 2016, other expense, net consisted primarily of postponed financing costs and fees related to our revolving credit facility. For the year ended December 31, 2015, other expense, net consisted primarily of fees related to our revolving credit facility.

### ***Provision for Income Taxes***

We have incurred net losses since inception and have not recorded benefit provisions for U.S. federal income taxes or state income taxes since the tax benefits of our net losses have been offset by valuation allowances due to the uncertainty associated with the utilization of net operating loss carryforwards.

For the year ended December 31, 2014, we performed an analysis pursuant to Internal Revenue Code Section 382, as well as similar state provisions, in order to determine whether any limitations might exist on the utilization of net operating losses and other tax attributes. Based on this analysis, we have determined that an ownership change occurred as a result of our initial public offering in June 2014, resulting in an annual limitation on the use of our net operating losses and other tax attributes as of such date. As a result, our prior net operating losses were limited to \$155.2 million, including built-in gains of \$42.0 million at the date of that ownership change. At December 31, 2017, we had \$194.2 million of net operating losses available to offset future federal income, if any, and which expire on various dates through December 31, 2037.

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act (TCJA) tax reform legislation. This legislation makes significant change in U.S. tax law including a reduction in the corporate tax rates, changes to net operating loss carryforwards and carrybacks, and a repeal of the corporate alternative minimum tax. The legislation reduced the U.S. corporate tax rate from the current rate of 34% to 21% for the year ending 2018. As a result of the enacted law, the Company was required to revalue deferred tax assets and liabilities at the 21% rate. This results in a decrease in the Company's net deferred tax asset and corresponding valuation allowance of \$26.7 million. As the Company maintains a full valuation allowance against its net deferred tax asset position in the United States, this revaluation does not result in an income tax expense or benefit in the current period. The provisions of the TCJA related to the one-time mandatory transition tax on deemed repatriation did not have an impact on the Company's results of operations during the year ended December 31, 2017. The other provisions of the TCJA did not have a material impact on the Company's 2017 consolidated financial statements.

### **Results of Operations**

The following tables set forth our results of operations for the periods presented:

	Year Ended December 31,		
	2017	2016	2015
	(\$ in thousands)		
Revenue:			
Product	\$ 109,590	\$ 115,490	\$ 120,532
Research services	2,041	2,248	1,986
Total revenue	111,631	117,738	122,518
Cost of revenue:			
Product	92,052	93,123	96,865
Research services	908	1,304	1,005
Gross profit	18,671	23,311	24,648
Operating expenses:			
Research and development	6,180	5,306	5,253
Sales and marketing	12,604	11,810	10,562
General and administrative	19,023	17,415	15,068
Total operating expenses	37,807	34,531	30,883
Loss from operations	(19,136)	(11,220)	(6,235)
Other expense, net:			
Interest expense, net	(185)	(147)	(182)
Postponed financing costs	—	(656)	—
Total other expense, net	(185)	(803)	(182)
Net loss	\$ (19,321)	\$ (12,023)	\$ (6,417)

**Year ended December 31, 2017 compared to year ended December 31, 2016**

The following tables set forth our results of operations for the periods presented:

	Year Ended December 31,				Year Ended December 31,	
	2017	2016	\$ Change	% Change	2017	2016
	(\$ in thousands)				(Percentage of total revenue)	
<b>Revenue:</b>						
Product	\$ 109,590	\$ 115,490	\$ (5,900)	(5)%	98%	98%
Research services	2,041	2,248	(207)	(9)%	2%	2%
Total revenue	111,631	117,738	(6,107)	(5)%	100%	100%
<b>Cost of revenue:</b>						
Product	92,052	93,123	(1,071)	(1)%	82%	79%
Research services	908	1,304	(396)	(30)%	1%	1%
Gross profit	18,671	23,311	(4,640)	(20)%	17%	20%
<b>Operating expenses:</b>						
Research and development	6,180	5,306	874	16%	6%	5%
Sales and marketing	12,604	11,810	794	7%	11%	10%
General and administrative	19,023	17,415	1,608	9%	17%	15%
Total operating expenses	37,807	34,531	3,276	9%	34%	29%
Loss from operations	(19,136)	(11,220)	(7,916)	71%	(17)%	(10)%
<b>Other expense, net:</b>						
Interest expense, net	(185)	(147)	(38)	26%	(0)%	0%
Postponed financing costs	—	(656)	656	(100)%	0%	(1)%
Total other expense, net	(185)	(803)	618	(77)%	(0)%	(1)%
Net loss	\$ (19,321)	\$ (12,023)	\$ (7,298)	61%	(17)%	(10)%

**Revenue**

	Year Ended December 31,				Change	
	2017		2016		Amount	Percentage
Amount	Percentage of Revenue	Amount	Percentage of Revenue			
	(\$ in thousands)					
<b>Revenue:</b>						
Product	\$ 109,590	98%	\$ 115,490	98%	\$ (5,900)	(5)%
Research services	2,041	2%	2,248	2%	(207)	(9)%
Total Revenue	\$ 111,631	100%	\$ 117,738	100%	\$ (6,107)	(5)%

The following chart sets forth product shipments in square feet for the periods presented:

	Year Ended December 31,		Change	
	2017	2016	Amount	Percentage
Product shipments in square feet (in thousands)	37,519	44,286	(6,767)	(15)%

Total revenue decreased by \$6.1 million, or 5%, in 2017 to \$111.6 million from \$117.7 million in 2016 due principally to a decrease in product revenue.

Product revenue decreased by \$5.9 million, or 5%, to \$109.6 million in 2017 from \$115.5 million in 2016. This decrease was principally the result of a decrease in the sales in the Asian market, led by the conclusion of the multiyear petrochemical project with Reliance Industries Limited, offset, in part, by an increase in revenue in the U.S. energy infrastructure market, including growth in district energy, LNG and power, and in the subsea market. Product revenue for the year ended 2017 included \$16.7 million in sales to Distribution International, Inc. and \$13.2 million to TechnipFMC plc. Product revenue for the year ended December 31, 2016 included \$29.3 million to a Reliance Industries Limited and \$17.3 million to Distribution International, Inc.

The average selling price per square foot of our products increased by an effective \$0.31, or 12%, to \$2.92 per square foot for the year ended December 31, 2017 from \$2.61 per square foot for the year ended December 31, 2016. The increase in average selling price reflects a year-over-year increase in the mix of high-priced subsea products, combined with a decrease in the volume of products sold to Reliance Industries Limited with lower, project-based pricing. This increase in average selling price had the effect of increasing product revenue by approximately \$11.6 million for the year ended December 31, 2017.

In volume terms, product shipments decreased 6.8 million square feet, or 15%, to 37.5 million square feet of aerogel products for the year ended December 31, 2017, as compared to 44.3 million square feet in the year ended December 31, 2016. The decrease in product volume had the effect of decreasing product revenue by approximately \$17.6 million for the year ended December 31, 2017.

Research services revenue decreased by \$0.2 million, or 9%, to \$2.0 million in 2017 from \$2.2 million in 2016. The decrease was primarily due to the timing and amount of funding available under research contracts during the year ended December 31, 2017 from the comparable period in 2016.

Product revenue as a percentage of total revenue was 98% of total revenue in 2017 and 2016. Research services revenue was 2% of total revenue in 2017 and 2016. We expect that product revenue will continue to comprise a significant percentage of our total revenue in the long-term.

During 2018, we may experience a decrease in product and total revenue versus the comparable period in 2017. The potential decline in revenue is the result of the conclusion of a multiyear petrochemical project with Reliance Industries Limited and a projected decrease in the volume of subsea projects, which together comprised 19% of product revenue during 2017.

### Cost of Revenue

	Year Ended December 31,						Change	
	2017			2016			Amount	Percentage
	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage of Related Revenue	Percentage of Total Revenue		
(\$ in thousands)								
Cost of revenue:								
Product	\$ 92,052	84%	82%	\$ 93,123	81%	79%	\$ (1,071)	(1)%
Research services	908	44%	1%	1,304	58%	1%	(396)	(30)%
Total cost of revenue	<u>\$ 92,960</u>	83%	83%	<u>\$ 94,427</u>	80%	80%	<u>\$ (1,467)</u>	(2)%

Total cost of revenue decreased by \$1.5 million, or 2%, to \$93.0 million in 2017 from \$94.4 million in 2016. The decrease in total cost of revenue was the result of a decrease of \$2.2 million in manufacturing expense and a decrease of \$0.4 million in cost of research services, offset, in part, by an increase of \$0.7 million in material costs and \$0.4 million in warranty expense.

Product cost of revenue decreased \$1.1 million, or 1%, to \$92.1 million in 2017 from \$93.1 million in 2016. The \$1.1 million decrease was the result of a decrease in manufacturing expense of \$2.2 million, offset, in part by an increase in material costs of \$0.7 million and an increase in warranty expense of \$0.4 million. The decrease in manufacturing expense included decreases in utilities expense of \$1.6 million and labor costs of \$0.7 million, offset, in part, by an increase in all other manufacturing expense of \$0.2 million. The decrease in manufacturing expense also reflected a reduction in manufacturing personnel and expense associated with our plan to decrease output during the year to reduce inventory balances.

Product cost of revenue as a percentage of product revenue increased to 84% during 2017 from 81% in 2016. This increase was principally the result of a shift in mix to higher cost products for the subsea market and the 25% decrease in manufacturing output during 2017 versus 2016.

We expect that cost of product revenue and cost of product revenue as a percentage of product revenue will decrease slightly during 2018 versus 2017. The projected decrease in cost of product revenue in absolute dollars and as a percentage of product revenue reflects the impact of a planned increase in manufacturing output and an expected favorable mix of products sold, offset, in part, by a planned increase in personnel and expense in support of our capacity expansion and growth initiatives.

Research services cost of revenue decreased by \$0.4 million, or 30%, to \$0.9 million in 2017 from \$1.3 million in 2016. The decrease in research services cost of revenue was due to the 9% decrease in research services revenue during 2017 and an increase in the mix of internal labor versus outside services required to support the contracted research.

## Gross Profit

	Year Ended December 31,				Change	
	2017		2016		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Gross profit	\$ 18,671	17%	\$ 23,311	20%	\$ (4,640)	(20)%

Gross profit decreased \$4.6 million, or 20%, to \$18.7 million in 2017 from \$23.3 million in 2016. This \$4.6 million decrease was the result of the \$6.1 million decrease in total revenue offset, in part, by a \$1.5 million decrease in total cost of revenue. The decrease in revenue was led by the conclusion of the multiyear petrochemical project with Reliance Industries Limited, offset, in part, by increases in revenue in the U.S. energy infrastructure market and in the subsea market. The \$1.1 million decrease in product cost of revenue was the result of a decrease in manufacturing expense of \$2.2 million, offset, in part by an increase in material costs of \$0.7 million and an increase in warranty expense of \$0.4 million. The decrease in manufacturing expense reflected a reduction in manufacturing personnel and expense associated with a decrease in output by 25% during the year.

Total cost of revenue decreased by only 2% despite a 5% decline in total revenue during 2017 due principally to the high proportion of fixed costs in our manufacturing facility. As a result, gross profit as a percentage of total revenue decreased to 17% of total revenue in 2017 as compared to 20% in 2016.

In 2018, we expect gross profit as a percentage of total revenue will increase slightly from the comparable period in 2017. The projected increase in gross profit during 2018 reflects the impact of a planned increase in manufacturing output and an expected favorable mix of products sold, offset, in part, by a planned increase in personnel and expense in support of our capacity expansion and growth initiatives.

## Research and Development Expenses

	Year Ended December 31,				Change	
	2017		2016		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Research and development expenses	\$ 6,180	6%	\$ 5,306	5%	\$ 874	16%

Research and development expenses increased \$0.9 million, or 16% to \$6.2 million in 2017 from \$5.3 million during 2016. The \$0.9 million increase was the result of increases in payroll related costs of \$0.4 million, depreciation expense of \$0.3 million and professional fees of \$0.2 million.

We expect that our research, development and engineering personnel and expenses during 2018 will increase from 2017 levels in support of innovative products, advanced process technologies, and new markets. Due to the expected growth in research and development expenses, we expect research and development expenses as a percentage of total revenue to increase in 2018.

In the long-term, we expect to continue to increase investment in research, development and engineering personnel, projects and infrastructure in support of efforts to develop new products, technologies and markets. However, we expect that research and development expenses will decline as a percentage of total revenue in the long-term due to projected growth in product revenue.

## Sales and Marketing Expenses

	Year Ended December 31,				Change	
	2017		2016		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Sales and marketing expenses	\$ 12,604	11%	\$ 11,810	10%	\$ 794	7%

Sales and marketing expenses increased by \$0.8 million, or 7%, to \$12.6 million in 2017 from \$11.8 million during 2016. The \$0.8 million increase was the result of a \$1.4 million increase in payroll and related costs associated with an increase in sales personnel, offset, in part, by reduction of \$0.4 million in professional fees and \$0.2 million in marketing expenses. We expect sales and marketing expenses to increase during 2018 in line with a planned increase in sales personnel and marketing initiatives. Due to the



expected growth in sales and marketing expenses, we expect sales and marketing expenses as a percentage of total revenue to increase in 2018.

We expect that sales and marketing expenses will increase in absolute dollars in the long term as we continue to increase sales personnel and marketing efforts in support of expected growth in demand for our products. However, we expect that sales and marketing expenses will decrease as a percentage of total revenue in the long-term due to projected growth in product revenue.

### General and Administrative Expenses

	Year Ended December 31,				Change	
	2017		2016		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
(\$ in thousands)						
General and administrative expenses	\$ 19,023	17%	\$ 17,415	15%	\$ 1,608	9%

General and administrative expenses increased by \$1.6 million, or 9%, to \$19.0 million in 2017 from \$17.4 million in 2016. The \$1.6 million increase was primarily the result of an increase in compensation costs of \$1.1 million, \$0.5 million in write-offs of customer receivables, and \$0.2 million in professional fees, offset, in part, by a decrease in patent enforcement expense of \$0.1 million and facility expenses of \$0.1 million. We expect general and administrative expenses to decrease during 2018 due to expected decreases in patent enforcement costs and stock-based compensation. Due to the projected decrease in general and administrative expenses, we expect general and administrative expenses as a percentage of total revenue to decrease in 2018.

We expect to increase general and administrative personnel and expense levels in the long term to support the anticipated growth of our business and continued expansion of our manufacturing operations. We also expect that the patent enforcement actions, described in more detail under “Legal Proceedings” in part I, Item 3, of this Annual Report on Form 10-K, will continue to result in high levels of legal expense in the near term and, if such actions are protracted, could result in significant additional legal expense over the medium to long term. In the longer term, we expect that general and administrative expenses will increase in absolute dollars but decrease as a percentage of revenue due to projected growth in product revenue.

### Other Expense, Net

	Year Ended December 31,				Change	
	2017		2016		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
(\$ in thousands)						
Other expense, net						
Interest expense, net	\$ (185)	(0)%	\$ (147)	(0)%	\$ (38)	26%
Postponed financing costs	—	—%	(656)	(1)%	656	(100)%
Total other expense, net	\$ (185)	(0)%	\$ (803)	(1)%	\$ 618	(77)%

Total other expense, net, decreased by \$0.6 million to \$0.2 million in 2017 from \$0.8 million in 2016. The \$0.6 million decrease was primarily the result of a decrease of \$0.7 million in postponed financing costs, offset, in part, by a small increase in interest expense. Interest expense in 2017 and 2016 was comprised primarily of fees and interest expense related to our revolving credit facility.

*Year ended December 31, 2016 compared to year ended December 31, 2015*

The following tables set forth our results of operations for the periods presented:

	Year Ended December 31,				Year Ended December 31,	
	2016	2015	\$ Change	% Change	2016	2015
	(\$ in thousands)				(Percentage of total revenue)	
<b>Revenue:</b>						
Product	\$ 115,490	\$ 120,532	\$ (5,042)	(4)%	98%	98%
Research services	2,248	1,986	262	13%	2%	2%
Total revenue	117,738	122,518	(4,780)	(4)%	100%	100%
<b>Cost of revenue:</b>						
Product	93,123	96,865	(3,742)	(4)%	79%	79%
Research services	1,304	1,005	299	30%	1%	1%
Gross profit	23,311	24,648	(1,337)	(5)%	20%	20%
<b>Operating expenses:</b>						
Research and development	5,306	5,253	53	1%	5%	4%
Sales and marketing	11,810	10,562	1,248	12%	10%	9%
General and administrative	17,415	15,068	2,347	16%	15%	12%
Total operating expenses	34,531	30,883	3,648	12%	29%	25%
Loss from operations	(11,220)	(6,235)	(4,985)	80%	(10)%	(5)%
<b>Other expense, net:</b>						
Interest expense, net	(147)	(182)	35	(19)%	(0)%	(0)%
Postponed financing costs	(656)	—	(656)	N/A	(1)%	0%
Total other expense, net	(803)	(182)	(621)	341%	(1)%	(0)%
Net loss	\$ (12,023)	\$ (6,417)	\$ (5,606)	87%	(10)%	(5)%

**Revenue**

	Year Ended December 31,				Change	
	2016		2015		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
<b>Revenue:</b>						
Product	\$ 115,490	98%	\$ 120,532	98%	\$ (5,042)	(4)%
Research services	2,248	2%	1,986	2%	262	13%
Total Revenue	\$ 117,738	100%	\$ 122,518	100%	\$ (4,780)	(4)%

The following chart sets forth product shipments in square feet for the periods presented:

	Year Ended December 31,		Change	
	2016	2015	Amount	Percentage
Product shipments in square feet (in thousands)	44,286	42,246	2,040	5%

Total revenue decreased by \$4.8 million, or 4%, in 2016 to \$117.7 million from \$122.5 million in 2015 due principally to a decrease in product revenue associated with the impact of constrained capital investment and low activity levels in the global energy infrastructure market.

Product revenue decreased by \$5.0 million, or 4%, to \$115.5 million in 2016 from \$120.5 million in 2015. This decrease was principally the result of a decrease in the sales of our aerogel products in the subsea market and the European energy market offset, in part, by an increase in sales in the Asian energy market and the building materials market.

The average selling price per square foot of our products decreased by an effective \$0.24, or 8%, to \$2.61 per square foot for the year ended December 31, 2016 from \$2.85 per square foot for the year ended December 31, 2015. The decrease in average selling price reflects a year-over-year decline in the mix of high-priced subsea products, combined with an increase in the mix of products

sold to Reliance Industries Limited with project-based pricing. This decrease in average selling price had the effect of decreasing product revenue by \$10.7 million for the year ended December 31, 2016.

In volume terms, product shipments increased 2.0 million square feet, or 5%, to 44.3 million square feet of aerogel products for the year ended December 31, 2016, as compared to 42.2 million square feet in the year ended December 31, 2015. The increase in volume was supported by the increase in manufacturing capacity associated with the operation of the third production line in the East Providence facility for a full year. The increase in product volume had the effect of increasing product revenue by approximately \$5.7 million for the year ended December 31, 2016.

Research services revenue increased by \$0.3 million, or 13%, to \$2.2 million in 2016 from \$2.0 million in 2015. The increase was primarily due to the timing and amount of funding available under research contracts during the year ended December 31, 2016 from the comparable period in 2015.

Product revenue as a percentage of total revenue was 98% of total revenue in 2016 and 2015, respectively. Research services revenue was 2% of total revenue in 2016 and 2015, respectively.

### Cost of Revenue

	Year Ended December 31,						Change	
	2016			2015			Amount	Percentage
	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage of Related Revenue	Percentage of Total Revenue		
(\$ in thousands)								
Cost of revenue:								
Product	\$ 93,123	81%	79%	\$ 96,865	80%	79%	\$ (3,742)	(4)%
Research services	1,304	58%	1%	1,005	51%	1%	299	30%
Total cost of revenue	<u>\$ 94,427</u>	80%	80%	<u>\$ 97,870</u>	80%	80%	<u>\$ (3,443)</u>	(4)%

Total cost of revenue decreased by \$3.4 million, or 4%, to \$94.4 million in 2016 from \$97.9 million in 2015. The decrease in total cost of revenue was the result of a decrease of \$6.0 million in material costs, offset, in part, by an increase of \$2.3 million in manufacturing expense and an increase of \$0.3 million in cost of research services.

Product cost of revenue decreased \$3.7 million, or 4%, to \$93.1 million in 2016 from \$96.9 million in 2015. The \$3.7 million decrease was the result of a \$6.0 million decrease in material costs, offset, in part, by a \$2.3 million increase in manufacturing expense year over year. The increase in manufacturing expense included increases in compensation expense of \$0.9 million, utility expenses of \$0.3 million and maintenance and facility expense of \$1.1 million. The increased level of manufacturing expense was driven by operation of the third production line in the East Providence facility for a full year in 2016 versus three quarters in 2015. Despite growth in product volume of 5% during the year ended December 31, 2016, material costs declined due to strong improvement in manufacturing yields and a shift in mix to lower cost products versus the comparable period in 2015.

Product cost of revenue as a percentage of product revenue increased to 81% during 2016 from 80% in 2015. This increase was the result of the combination of the increase in manufacturing expense associated with operation of the third production line in the East Providence facility for a full year in 2016 and the decline in product revenue associated with the impact of constrained capital investment and low activity levels in the global energy infrastructure market. The impact of the increase in manufacturing expense and decline in product revenue was offset, in part, by the improvement in manufacturing yields and the shift in mix to lower cost products during the year ended December 31, 2016 versus the comparable period in 2015.

Research services cost of revenue increased by \$0.3 million, or 30%, to \$1.3 million in 2016 from \$1.0 million in 2015. The increase in research services cost of revenue was due to the 13% increase in research services revenue during 2016 and an unfavorable mix of labor and expense required to perform the contracted research.

## Gross Profit

	Year Ended December 31,				Change	
	2016		2015		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Gross profit	\$ 23,311	20%	\$ 24,648	20%	\$ (1,337)	(5)%

Gross profit decreased \$1.3 million, or 5%, to \$23.3 million in 2016 from \$24.6 million in 2015. This \$1.3 million decrease was the result of the \$4.8 million decrease in total revenue and a related \$3.4 million decrease in total costs of sales. The decrease in revenue was principally associated with the impact of constrained capital investment and low activity levels in the global energy infrastructure market. The decrease in total cost of sales was driven by the reduction in material costs offset, in part, by the increase in manufacturing expense and the increase in contract research expense.

Gross profit as a percentage of total revenue remained unchanged at approximately 20% of total revenue for both 2016 and 2015. The percentage decline in total revenue and total cost of revenue during 2016 each approximated 4% during 2016. As a result, gross profit as a percentage of total revenue remained constant for the years ended December 31, 2016 and 2015.

## Research and Development Expenses

	Year Ended December 31,				Change	
	2016		2015		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Research and development expenses	\$ 5,306	5%	\$ 5,253	4%	\$ 53	1%

Research and development expenses remained flat at \$5.3 million for the years ended December 31, 2016 and 2015. An increase in depreciation expense of \$0.1 million was offset by a decrease in employee compensation of \$0.1 million.

## Sales and Marketing Expenses

	Year Ended December 31,				Change	
	2016		2015		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Sales and marketing expenses	\$ 11,810	10%	\$ 10,562	9%	\$ 1,248	12%

Sales and marketing expenses increased by \$1.2 million, or 12%, to \$11.8 million in 2016 from \$10.6 million during 2015. The \$1.2 million increase was the result of a \$0.3 million increase in payroll and related costs associated with an increase in sales personnel, \$0.6 million in professional and commission fees and \$0.4 million in travel expenses of our sales force, offset, in part, by a reduction in marketing expense of \$0.1 million.

## General and Administrative Expenses

	Year Ended December 31,				Change	
	2016		2015		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
General and administrative expenses	\$ 17,415	15%	\$ 15,068	12%	\$ 2,347	16%

General and administrative expenses increased by \$2.3 million, or 16%, to \$17.4 million in 2016 from \$15.1 million in 2015. The \$2.3 million increase was primarily the result of increases in the patent enforcement expense of \$3.3 million offset, in part, by decreases in payroll and related costs of \$0.6 million and facility expenses of \$0.4 million.

## Other Expense, net

	Year Ended December 31,				Change	
	2016		2015		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Other expense, net						
Interest expense, net	\$ (147)	(0)%	\$ (182)	(0)%	\$ 35	(19)%
Postponed financing costs	(656)	(1)%	—	—%	(656)	N/A
Total other expense, net	<u>\$ (803)</u>	<u>(1)%</u>	<u>\$ (182)</u>	<u>(0)%</u>	<u>\$ (621)</u>	<u>341%</u>

Total other expense, net, increased by \$0.6 million to \$0.8 million in 2016 from \$0.2 million in 2015. The \$0.6 million increase was primarily the result of a \$0.7 million charge relating to financing costs, offset, in part, by a small decrease in interest expense. Interest expense in 2016 and 2015 was comprised primarily of costs related to our revolving credit facility.

## Liquidity and Capital Resources

### Overview

We have experienced significant losses and invested substantial resources since our inception to develop, commercialize and protect our aerogel technology and to build a manufacturing infrastructure capable of supplying aerogel products at the volumes and costs required by our customers. These investments have included research and development and other operating expenses, capital expenditures and investment in working capital balances.

Through 2015, we experienced revenue growth and gained share in our target markets. Despite a decline in revenue in 2016 and 2017 and a potential decline in revenue in 2018, our financial projections anticipate long-term revenue growth, with increasing levels of gross profit and improved cash flows from operations. To support this growth, we expect to incur up to \$20 million of capital expenditures related to our plan to increase the capacity of our East Providence, Rhode Island manufacturing facility by 20% by the end of 2020. In addition, we expect to incur up to \$130 million of capital expenditures to construct a first manufacturing line in a planned second manufacturing facility to be located in Statesboro, Georgia which, while currently delayed, we believe will ultimately be needed to support this expected long term growth in demand.

We believe that our existing cash balance and anticipated credit will be sufficient to fund a portion of the planned expansion of our East Providence manufacturing facility. We also expect to receive a \$5 million prepayment in two installments from BASF during 2018 in support of our capacity expansion plans, our process improvement initiatives and our new business development efforts. In addition, we plan to manage other capital expenditures and working capital balances to maintain the cash resources required to support current operating requirements and the initial phases of our capacity expansion plan.

Beyond 2018, we will need to supplement our cash balance with anticipated cash flows from operations, local government grants, debt financings, customer prepayments and equity financings, if necessary, to provide the capital required to complete the expansion of our existing manufacturing facility and the first production line in our second manufacturing facility.

### Primary Sources of Liquidity

Our principal sources of liquidity are currently our cash and cash equivalents and our revolving credit facility with Silicon Valley Bank. Cash and cash equivalents consist primarily of cash and money market accounts on deposit with banks. As of December 31, 2017, we had \$10.7 million of cash and cash equivalents.

At December 31, 2017, we had debt obligations of \$3.8 million related to borrowings under our revolving credit facility with Silicon Valley Bank. At December 31, 2017, we also had \$2.3 million of outstanding letters of credit secured by our revolving credit facility.

We have maintained the revolving credit facility, as amended from time to time, with Silicon Valley Bank since March 2011. On January 25, 2018, our revolving credit facility was amended to extend the maturity date of the facility to April 28, 2018. Under our revolving credit facility, we are permitted to borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. At our election, the interest rate applicable to borrowings under the revolving credit facility may be based on the prime rate or LIBOR. Prime rate-based rates vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum, while LIBOR-based rates vary from LIBOR plus 3.75% per annum to LIBOR plus 4.25% per annum. In addition, we are

required to pay a monthly unused revolving line facility fee of 0.5% per annum of the average unused portion of the revolving credit facility. We intend to extend or replace the facility prior to its maturity.

The effective amount available to us under the facility at December 31, 2017 was \$13.9 million after giving effect to the \$3.8 million outstanding borrowings and the \$2.3 million of outstanding letters of credit.

### *Analysis of Cash Flow*

The following table summarizes our cash flows for the periods indicated:

	Year Ended December 31,		
	2017	2016	2015
	(\$ in thousands)		
Net cash (used in) provided by:			
Operating activities	\$ (4,606)	\$ (578)	\$ 5,359
Investing activities	(6,118)	(13,216)	(21,956)
Financing activities	3,332	(924)	(318)
Net (decrease) in cash	(7,392)	(14,718)	(16,915)
Cash, beginning of period	18,086	32,804	49,719
Cash and cash equivalents, end of period	<u>\$ 10,694</u>	<u>\$ 18,086</u>	<u>\$ 32,804</u>

#### *Operating Activities*

During 2017, we used \$4.6 million net cash in operating activities, as compared to the use of \$0.6 million in net cash during 2016, an increase in the use of cash of \$4.0 million. This increase in use of cash was the result of the increase in net loss adjusted for non-cash items of \$7.4 million, offset, in part, by an increase in cash provided by changes in working capital of \$3.4 million.

During 2016, we used \$0.6 million in net cash in operating activities, as compared to generating \$5.4 million in net cash during the comparable period in 2015, a decrease in net cash provided of \$6.0 million. This decrease was the result of an increase in net cash used for changes in operating assets and liabilities of \$1.0 million and an unfavorable year-to-year change in net loss adjusted for non-cash items of \$5.0 million.

#### *Investing Activities*

Net cash used in investing activities is primarily related to capital expenditures to support our growth. Net cash used in investing activities for 2017 and 2016 totaled \$6.1 million and \$13.2 million, respectively.

Net cash used in investing activities in 2017 included \$6.1 million in capital expenditures for machinery to improve the throughput and efficiency of our East Providence facility.

Net cash used in investing activities in 2016 included \$7.2 million in capital expenditures for engineering design and other pre-construction costs related to our planned second manufacturing facility in Statesboro, Georgia. In addition, net cash used in investing activities in 2016 included capital expenditures for machinery and equipment for our full scale pilot line, to support our new product line for the power market and to improve the throughput and efficiency of our East Providence facility.

#### *Financing Activities*

Net cash provided by financing activities in 2017 totaled \$3.3 million principally due to \$27.3 million in borrowing on our revolving credit facility offset by \$23.5 million in associated repayments. In addition the Company made \$0.4 million for payments for employee tax withholdings associated with the vesting of restricted stock units and less than \$0.1 million for repayments of obligations under capital leases.

Net cash used in financing activities in 2016 totaled \$0.9 million and consisted of approximately \$0.7 million related to postponed financing costs, \$0.2 for payments made for employee tax withholdings associated with the vesting of restricted stock, and less than \$0.1 million for repayments of obligations under capital leases.

### ***Capital Spending and Future Capital Requirements***

We have made capital expenditures primarily to develop and expand our manufacturing capacity. Our capital expenditures totaled \$6.1 million in 2017, \$13.2 million in 2016 and \$22.0 million in 2015. As of December 31, 2017, we had capital commitments of approximately \$0.1 million, which included commitments for which we have entered into contracts as well as commitments authorized by our Board of Directors. These commitments relate to the improvement of our existing production lines in our East Providence facility. These commitments consist primarily of equipment cost and construction costs. We plan to fund these capital commitments from available cash proceeds from our IPO and anticipated available credit.

We intend to fund capital expenditures related to both the expansion of capacity of our existing manufacturing facility and to the development and construction of our planned second manufacturing facility with the remaining proceeds from our IPO, anticipated available credit, cash flow from operations, local government grants, debt financings, customer prepayments and equity financings, if necessary. We estimate that the total expenditures for capacity expansion of our existing facility will be approximately \$15 million to \$20 million. We estimate the total expenditures for plant infrastructure and the first production line in our second manufacturing facility will be approximately \$120 million to \$130 million.

### **Off-Balance Sheet Arrangements**

Since inception, we have not engaged in any off balance sheet activities as defined in Item 303(a)(4) of Regulation S-K.

### **Contractual Obligations and Commitments**

The following table summarizes our contractual obligations as of December 31, 2017, under contracts that provide for fixed and determinable payments over the periods indicated:

<b>Contractual Obligations</b>	<b>Total</b>	<b>Less than 1 Year</b>	<b>1-3 Years</b>	<b>4-5 Years</b>	<b>More than 5 Years</b>
			(\$ in thousands)		
Purchase order commitments	\$ 4,707	\$ 4,707	\$ —	\$ —	\$ —
Supplier purchase commitments	13,411	5,004	8,407	—	—
Operating leases	5,978	1,335	2,131	960	1,552
Total	<u>\$ 24,096</u>	<u>\$ 11,046</u>	<u>\$ 10,538</u>	<u>\$ 960</u>	<u>\$ 1,552</u>

### ***Operating and Capital Leases***

We lease our office space for our corporate offices in Northborough, Massachusetts, which expires in 2026, and warehouse space and land near our East Providence facility, which expire at various dates from 2018 through 2021, under non-cancelable operating lease agreements. See “Item 2 — Properties.” We also lease vehicles and equipment under non-cancelable operating leases that expire at various dates.

#### ***Operating Leases***

On June 29, 2016, we entered into an Industrial Real Estate Lease, or the Lease, with Cabot II- MA1M03, LLC, or Cabot Properties, to lease approximately 51,650 square feet of space located at 30 Forbes Road, Northborough, MA 01532, the location of our current headquarters. The Lease supersedes the Multi-Tenant Industrial Net Lease dated as of August 20, 2001, as amended, by and between us and TMT 290 Industrial Park, Inc., Cabot Properties’ predecessor-in-interest. The term of the Lease began on January 1, 2017 and ends on December 31, 2026. The annual base rent associated with the Lease was approximately \$408,000 during the first year, increasing by approximately 3% annually for the term of the Lease. The Lease also provides for our payment of our pro rata share of real estate taxes and certain other expenses. Upon expiration of the Lease term, we will have the right to extend the Lease for an additional term of three years.

#### ***Supply Agreement***

In June 2016, we entered into a supply agreement and a side agreement with BASF SE. In February 2018, we entered into an amended and restated supply agreement and side agreement with BASF Polyurethanes GmbH (BASF) (as amended and restated, the supply agreement). Pursuant to the supply agreement, we will sell exclusively to BASF our Spaceloft A2 product, or the Product, at annual volumes to be specified by BASF, subject to certain volume limits. Pricing shall be based on a cost-plus formula. The supply agreement also specifies the markets in which BASF will be permitted to sell Product. The supply agreement will terminate on December 31, 2027, if not renewed prior to such date. Upon expiration of the supply agreement, we will be subject to a post-termination supply commitment for an additional two years. In addition to the customary terms associated with supply agreements, in

support of our capacity expansion plan, process optimization projects, and research and development activities, BASF, in its sole discretion, may make advances, or prepayments, to us in the aggregate amount of up to \$22 million during the term of the supply agreement. BASF has agreed to make a prepayment in the amount of \$5 million to us in two installments in 2018. We have secured our obligation to repay the prepayment with a first priority security interest in real estate, machinery and equipment located at our existing manufacturing facility in East Providence, Rhode Island. Additionally, we granted non-exclusive licenses to our Rhode Island subsidiary under our intellectual property as necessary to operate such machinery and equipment.

After January 1, 2019, we will credit 25.3% of any amounts that we invoice for Product sold to BASF against the outstanding balance of the 2018 prepayment, if any, with such credits limited to a specified annual amount. If any of the 2018 prepayment remains uncredited as of December 31, 2021, BASF may request that we repay the uncredited amount to BASF on or after December 31, 2021. The specific terms of additional tranches of prepayments, if any, are to be agreed by us and BASF at a future date. BASF has no obligation to purchase Product under the supply agreement. We may repay any prepayment balance to BASF at any time in whole or in part for any reason. In the event of a sale of all or substantially all of our assets or a change of control of Aspen, BASF may in certain instances have the right to terminate the supply agreement, in which case any remaining balance of prepayments as of such sale or change of control will be due and payable to BASF within 30 days of the relevant transaction.

#### ***Joint Development Agreement***

In June 2016, we and BASF SE also entered into a Joint Development Agreement, or the JDA, setting forth the rights and obligations of us and BASF SE with respect to collaboration between the parties on the development and commercialization of new products. Under the JDA, each party may propose that the parties enter into joint efforts to seek to develop one or more products or services for commercialization on terms to be agreed by the parties. The JDA establishes a joint steering committee with equal representation from each of us and BASF SE to oversee any such collaboration. Unless otherwise agreed, all intellectual property created in the performance of joint development activities will generally be jointly owned by us and BASF SE. The JDA will have an initial term of two years with the option for the parties to renew at the expiration. Either party may terminate the JDA for any reason with 90-days prior notice to the other party, provided that such termination will not terminate any project under the JDA then in progress, with any such ongoing project able to be terminated by either party for any reason on 90-days prior notice to the other party.

#### ***Revolving Credit Facility***

In March 2011, we entered into a revolving credit facility with Silicon Valley Bank. This facility has been amended at various dates through December 2017. We further amended the agreement in January 2018 to extend the maturity date of the facility to April 28, 2018. Under the facility, we are permitted to borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. At our election, the interest rate applicable to borrowings under the amended revolving credit facility may be based on the prime rate or LIBOR. Prime rate-based rates vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum, while LIBOR-based rates vary from LIBOR plus 3.75% per annum to LIBOR plus 4.25% per annum. In addition, we are required to pay a monthly unused revolving line facility fee of 0.5% per annum of the average unused portion of the revolving credit facility.

At December 31, 2017, the amount available to us under the revolving credit facility was \$13.9 million after giving effect to \$3.8 million in borrowings and \$2.3 million of letters of credit outstanding under the facility.

#### ***Accrued Asset Retirement Obligations***

As of December 31, 2015, the Company had asset retirement obligations arising from requirements to perform certain asset retirement activities upon the termination of its Northborough, Massachusetts facility lease and upon disposal of certain machinery and equipment. The liability was initially measured at fair value and subsequently adjusted for accretion expense and changes in the amount or timing of the estimated cash flows. The corresponding asset retirement costs are capitalized as part of the carrying amount of the related long-lived asset and depreciated over the asset's remaining useful life.

During the year ended December 31, 2016, the Company incurred approximately \$0.2 million in expenditures in support of completing the restoration of 31,577 square feet of space formerly utilized for manufacturing operations in the Northborough, Massachusetts facility. This manufacturing space was vacated and returned to the landlord on July 1, 2016.

In June 2016, the Company executed an agreement to remain at the Northborough, Massachusetts facility through December 31, 2026. As part of the new agreement, the Company's obligation to restore the remaining space in the Northborough facility was eliminated. The settlement of the remaining reserve balance of approximately \$0.2 million was reclassified to accrued expenses and will be amortized as a reduction to rent expense over the term of the new lease agreement.



## Recent Accounting Pronouncements

### *Standards Implemented Since December 31, 2016*

In July 2015, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2015-11, Inventory (Topic 330), which, for entities that do not measure inventory using the last-in, first-out (LIFO) or retail inventory method, changes the measurement principle for inventory from the lower of cost or market to lower of cost and net realizable value. The ASU also eliminates the requirement for these entities to consider replacement cost or net realizable value less an approximately normal profit margin when measuring inventory. Public entities are required to apply the standard for fiscal years beginning after December 15, 2016, including interim periods within those fiscal periods. We adopted this standard effective January 1, 2017. Application of the standard has not resulted in any material impact on our consolidated financial statements or other disclosures.

In March 2016, the FASB issued ASU 2016-09. The amendment simplifies several aspects of the accounting for share-based payment transactions including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. For public entities, the amendments in ASU 2016-09 are effective for interim and annual reporting periods beginning after December 15, 2016. We adopted this standard effective January 1, 2017. We adopted the provisions of ASU 2016-09 related to the timing of accounting for the forfeitures of share based awards using a modified retrospective method by means of a cumulative-effect adjustment to equity as of January 1, 2017 of \$0.3 million. We adopted the other provisions of ASU 2016-09 prospectively.

### *Standards to be Implemented*

In August 2015, the FASB issued a deferral of ASU 2014-09, Revenue from Contracts with Customers. The standard replaces the transaction- and industry-specific revenue recognition guidance under current U.S. GAAP with a principle based approach for determining revenue recognition. As a result of the deferral, public entities are required to apply the revised revenue recognition standard for the annual reporting period beginning on or after December 15, 2017, including interim periods within that annual reporting period. We will adopt this standard using the modified retrospective method on January 1, 2018. We completed our analysis of the new revenue standard and determined that it will not materially impact the allocation and timing of recognition of previously reported revenues from the sale of products or performance of research and development services. In addition, we have determined that there are no incremental contract costs or contract fulfillment costs to be recognized in connection with the adoption. Based on our analysis, no adjustment to retained earnings will be required as of the January 1, 2018 adoption date. Accordingly, our application of the standard is not expected to have a material impact on our consolidated balance sheet at January 1, 2018 and will not have a material impact to our statement of operations. Additional disclosures will be required in future filings.

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842). FASB ASU 2016-02 modifies the accounting for leases and requires that all leases be recorded on the consolidated balance sheets as assets and liabilities. This update is effective for fiscal years beginning after December 15, 2018. Early application is permitted. We have not yet selected a transition method and are evaluating the effect the updated standard will have on our consolidated financial statements and related disclosures. We currently expect that most of our operating lease commitments will be subject to the new standard and recognized as right-of-use assets and operating lease liabilities. We expect application of the standard will increase reported value of both total assets and total liabilities upon adoption and will have a material impact on our consolidated financial statements and other disclosures.

In August 2016, the FASB issued ASU 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments (ASU 2016-15). This amendment addresses eight classification issues related to the statement of cash flows. The amendments in ASU 2016-15 are effective for public business entities for annual and interim periods in fiscal years beginning after December 15, 2017. Early adoption is permitted, including adoption in an interim period. We completed our assessment of the amendment and determined that adoption will not have a significant impact on our consolidated financial statements or other disclosures. We will adopt the provisions of the amendment effective January 1, 2018.

From time to time, new accounting pronouncements are issued by the FASB or other standard setting bodies and adopted by the Company as of the specified effective date. Unless otherwise discussed, we believe that the impact of recently issued standards that are not yet effective will not have a material impact on our financial position or results of operations upon adoption.

## Critical Accounting Policies and Estimates

Our financial statements are prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of our financial statements and related disclosures requires us to make estimates, assumptions and judgments that affect the reported amount of assets, liabilities, revenue, costs and expenses and related disclosures. We believe that the estimates, assumptions and judgments involved in these accounting policies have the greatest potential impact on our financial

statements; and therefore, we consider these to be our critical accounting policies. Accordingly, we evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions and conditions. See note 2 to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K for information about these critical accounting policies, as well as a description of our other significant accounting policies.

### ***Revenue Recognition***

We recognize product revenue from the sale of our line of aerogel products upon shipment or delivery, and research services revenue upon delivery of research and development services, including under contracts with various agencies of the U.S. government. Revenue is recognized when all of the following criteria are met: persuasive evidence of an arrangement exists, the price to the buyer is fixed or determinable, delivery has occurred or services have been provided and collectability is reasonably assured. Product revenue is recognized upon transfer of title and risk of loss, which is upon shipment or delivery. In general, our customary shipping terms are FOB shipping point. Products are typically delivered without significant post-sale obligations to customers other than standard warranty obligations for product defects. We provide warranties for our products and record the estimated cost within cost of sales in the period that the revenue is recorded. Our standard warranty period extends one to two years from the date of shipment, depending on the type of product purchased. Our warranties provide that our products will be free from defects in material and workmanship, and will, under normal use, conform to the specifications for the product. In 2017, we recorded warranty expense of \$0.9 million. This specific warranty charge was related to a product claim for a specific application issue. In 2016, we recorded warranty expense of \$0.5 million. This specific warranty charge was related to product warranty claims for a specific project. These claims were outside of the Company's typical experience. For the year ended December 31, 2015, warranty charges were immaterial to our consolidated financial statements. As of December 31, 2017, we had satisfied all outstanding warranty claims.

Research services revenue is derived from the execution of contracts awarded by the U.S. government, other government agencies and other institutions. Our research service arrangements require us to perform research to investigate new forms and applications of aerogel technology. We record revenue earned on research services contracts using the percentage-of-completion method in two ways: (1) for firm-fixed-price contracts, we accrue that portion of the total contract price that is allocable, on the basis of our estimates of costs incurred to date to total contract cost; (2) for cost-plus-fixed-fee contracts, we record revenue that is equal to total payroll cost incurred times a stated factor plus reimbursable expenses, to a stated upper limit. The primary cost in these arrangements is the labor effort expended in completing the research and the only deliverable other than labor hours expended is the reporting of the research results to the customer. Because the input measure of labor hours expended is also reflective of the output measure, it is a reliable means to measure the extent of progress towards completion. Contract costs and rates used to allocate overhead to contracts are subject to audit by the respective contracting government agency. Revisions in cost estimates and fees during the course of the contract are reflected in the accounting period in which the facts that require the revisions become known.

### ***Stock-based Compensation***

We maintain an equity incentive plan pursuant to which our board of directors may grant qualified and nonqualified stock options, restricted stock, restricted stock units and other stock-based awards to board members, officers, key employees and others who provide or have provided service to us.

We measure the costs associated with stock-based awards based on their estimated fair value at date of grant. We recognize the costs of stock-based awards as service, performance or market conditions are met. Future expense amounts for any particular quarterly or annual period could be affected by changes in our assumptions or changes in market conditions.

## Stock Options

We use the Black-Scholes option-pricing model to estimate the fair value of stock option awards. The determination of the estimated fair value of stock option awards is based on a number of complex and subjective assumptions. These assumptions include the determination of the estimated fair value of the underlying security (prior to our initial public offering), the expected volatility of the underlying security, a risk-free interest rate, the expected term of the option, and the forfeiture rate for the award class. The following assumptions were used to estimate the fair value of the option awards:

	Year Ended December 31,		
	2017	2016	2015
Weighted-average assumptions:			
Expected term (in years)	5.86	5.86	6.02
Expected volatility	51.95%	53.56%	57.95%
Risk free rate	1.99%	1.36%	1.79%
Expected dividend yield	—%	—%	—%

- The expected term represents the period that our stock-based awards are expected to be outstanding and is determined using the simplified method described in ASC Topic 718, *Compensation — Stock Compensation*, for all grants. We believe this is a better representation of the estimated life than our actual limited historical exercise behavior.
- For the years ended December 31, 2017, 2016 and 2015, the expected volatility is based on the weighted-average volatility of up to 17 companies within various industries that we believe are similar to our own
- The risk-free interest rate is based on U.S. Treasury zero-coupon issues with a remaining term equal to the expected life assumed at the date of grant.
- We use an expected dividend yield of zero, since we do not intend to pay cash dividends on our common stock in the foreseeable future, nor have we paid dividends on our common stock in the past.

During the year ended December 31, 2017, we adopted ASU 2016-09. The provisions of ASU 2016-09 related to the timing of accounting for the forfeitures of share based awards was adopted using a modified retrospective method by means of a cumulative-effect adjustment to equity as of January 1, 2017 of \$0.3 million. During each of the years ended December 31, 2016 and 2015, compensation expense has been reduced for an estimated forfeiture rate of 7.0%. Forfeitures were required to be estimated at the time of grant and revised, if necessary, in subsequent periods, if actual forfeitures differ from those estimates. Forfeitures were estimated based on voluntary termination behavior as well as analysis of actual option forfeitures.

For stock options that contained a market condition issued to the Company's chief executive officer during the year ended December 31, 2015, the Company used a Monte Carlo Simulation model to estimate the grant date fair value of awards expected to vest. The simulation model was based on the Black Scholes option-pricing model and a number of complex assumptions including (i) if the vesting condition is satisfied within the time-vesting periods, and (ii) the date the common stock price target is met per the terms of the agreement. For restricted stock awards issued to the Company's Chief Executive Officer that contain a performance condition, the Company assesses the probability that the performance condition will be satisfied. On August 2, 2017, the Company modified the performance target with respect to 78,125 shares of these awards. Upon modification, the Company determined that the performance-based condition of this restricted stock awards was probable and \$0.2 million in compensation has been recorded to date in conjunction with the award.

## Income Taxes

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date.

We recognize the effect of income tax positions only if those positions are more likely than not of being sustained. We account for uncertain tax positions using a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. Differences between tax positions taken in a tax return and amounts recognized in the financial statements are recorded as adjustments to income taxes payable or receivable, or adjustments to

defer red taxes, or both. Changes in recognition or measurement are reflected in the period in which the change in judgment occurs. We recognize penalties and interest related to recognized tax positions, if any, as a component of income tax expense.

Management's judgment and estimates are required in determining our tax provision, deferred tax assets and liabilities and any valuation allowance recorded against deferred tax assets. We review the recoverability of deferred tax assets during each reporting period by reviewing estimates of future taxable income, future reversals of existing taxable temporary differences and tax planning strategies that would, if necessary, be implemented to realize the benefit of a deferred tax asset before expiration. We have recorded a full valuation allowance against our deferred tax assets due to the uncertainty associated with the utilization of the net operating loss carryforwards. In assessing the realizability of deferred tax assets, we consider all available evidence, historical and prospective, with greater weight given to historical evidence, in determining whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of our deferred tax assets generally is dependent upon generation of future taxable income.

### ***Impairment of Long-Lived Assets***

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to future undiscounted net cash flows expected to be generated by the asset. If the carrying amount of an asset exceeds its estimated undiscounted future cash flows, an impairment charge is recognized for the amount by which the carrying amount of the asset exceeds the fair value of the asset. Fair value is determined through various valuation techniques including discounted cash flows models, quoted market values and third-party independent appraisals, as considered necessary.

## **Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK**

Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our market risk exposure results primarily from fluctuations in interest rates as well as from inflation. In the normal course of business, we are exposed to market risks, including changes in interest rates which affect our line of credit under our revolving credit facility as well as cash flows. We may also face additional exchange rate risk in the future as we expand our business internationally.

### ***Interest Rate Risk***

We are exposed to changes in interest rates in the normal course of our business. At December 31, 2017, we had unrestricted cash and cash equivalents of \$10.7 million. These amounts were held for working capital and capital expansion purposes and were invested primarily in deposit and money market accounts at a major financial institution in North America. Due to the short-term nature of these investments, we believe that our exposure to changes in the fair value of our cash as a result of changes in interest rates is not material.

As of December 31, 2017, we had \$3.8 million drawn and outstanding on our revolving credit facility. At December 31, 2017, we also had \$2.3 million of outstanding letters of credit supported by the revolving credit facility.

Under our revolving credit facility, we are permitted to borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. At our election, the interest rate applicable to borrowings under the revolving credit facility may be based on the prime rate or LIBOR. Prime rate-based rates vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum, while LIBOR-based rates vary from LIBOR plus 3.75% per annum to LIBOR plus 4.25% per annum. In addition, we are required to pay a monthly unused revolving line facility fee of 0.5% per annum of the average unused portion of the revolving credit facility. The maturity date of our revolving credit facility is April 28, 2018.

At December 31, 2017, the amount available to us under the revolving credit facility was \$13.9 million after giving effect to the \$3.8 million in borrowings and \$2.3 million of letters of credit outstanding under the facility.

### ***Inflation Risk***

Although we expect that our operating results will be influenced by general economic conditions, we do not believe that inflation has had a material effect on our results of operations during the periods presented in this report. However, our business may be affected by inflation in the future.

***Foreign Currency Exchange Risk***

We are subject to inherent risks attributed to operating in a global economy. Principally all of our revenue, receivables, purchases and debts are denominated in U.S. dollars.

**Item 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA**

**Report of Independent Registered Public Accounting Firm**

To the Board of Directors and Stockholders  
Aspen Aerogels, Inc.:

*Opinion on the Consolidated Financial Statements*

We have audited the accompanying consolidated balance sheets of Aspen Aerogels, Inc. and subsidiaries (the “Company”) as of December 31, 2017 and 2016, the related consolidated statements of operations, stockholders’ equity, and cash flows for each of the years in the three-year period ended December 31, 2017, and the related notes and financial statement schedule (collectively, the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2017, in conformity with U.S. generally accepted accounting principles.

*Basis for Opinion*

These consolidated financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (“PCAOB”) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company’s internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company’s auditor since 2002.

Boston, Massachusetts  
March 1, 2018

ASPEN AEROGELS, INC.

Consolidated Balance Sheets

	December 31,	
	2017	2016
	(In thousands, except share and per share data)	
<b>Assets</b>		
Current assets:		
Cash and cash equivalents	\$ 10,694	\$ 18,086
Accounts receivable, net of allowances of \$93 and \$93	26,764	17,535
Inventories	8,915	12,868
Prepaid expenses and other current assets	1,289	1,697
Total current assets	47,662	50,186
Property, plant and equipment, net	76,067	84,394
Other long-term assets	86	89
Total assets	\$ 123,815	\$ 134,669
<b>Liabilities and Stockholders' Equity</b>		
Current liabilities:		
Accounts payable	\$ 10,653	\$ 13,065
Accrued expenses	5,862	3,987
Revolving line of credit	3,750	—
Deferred revenue	1,304	1,043
Capital leases, current portion	—	35
Total current liabilities	21,569	18,130
Capital leases, excluding current portion	—	4
Deferred rent	1,303	971
Total liabilities	22,872	19,105
<b>Commitments and contingencies (Note 9)</b>		
Stockholders' equity:		
Preferred stock, \$0.00001 par value; 5,000,000 shares authorized, no shares issued or outstanding at December 31, 2017 and 2016	—	—
Common stock, \$0.00001 par value; 125,000,000 shares authorized, 23,643,189 shares issued and outstanding at December 31, 2017; 23,369,838 shares issued and outstanding at December 31, 2016	—	—
Additional paid-in capital	538,088	533,088
Accumulated deficit	(437,145)	(417,524)
Total stockholders' equity	100,943	115,564
Total liabilities and stockholders' equity	\$ 123,815	\$ 134,669

See accompanying notes to consolidated financial statements.

ASPEN AEROGELS, INC.

Consolidated Statements of Operations

	Year Ended December 31,		
	2017	2016	2015
	(In thousands, except share and per share data)		
Revenue:			
Product	\$ 109,590	\$ 115,490	\$ 120,532
Research services	2,041	2,248	1,986
Total revenue	<u>111,631</u>	<u>117,738</u>	<u>122,518</u>
Cost of revenue:			
Product	92,052	93,123	96,865
Research services	908	1,304	1,005
Gross profit	<u>18,671</u>	<u>23,311</u>	<u>24,648</u>
Operating expenses:			
Research and development	6,180	5,306	5,253
Sales and marketing	12,604	11,810	10,562
General and administrative	19,023	17,415	15,068
Total operating expenses	<u>37,807</u>	<u>34,531</u>	<u>30,883</u>
Loss from operations	<u>(19,136)</u>	<u>(11,220)</u>	<u>(6,235)</u>
Other expense, net:			
Interest expense, net	(185)	(147)	(182)
Postponed financing costs	—	(656)	—
Total other expense, net	<u>(185)</u>	<u>(803)</u>	<u>(182)</u>
Net loss	<u>\$ (19,321)</u>	<u>\$ (12,023)</u>	<u>\$ (6,417)</u>
Net loss per share:			
Basic and diluted	<u>\$ (0.83)</u>	<u>\$ (0.52)</u>	<u>\$ (0.28)</u>
Weighted-average common shares outstanding:			
Basic and diluted	<u>23,390,235</u>	<u>23,139,807</u>	<u>22,986,931</u>

See accompanying notes to consolidated financial statements.



ASPEN AEROGELS, INC.

Consolidated Statements of Stockholders' Equity  
(In thousands, except share and per share data)

	Preferred Stock \$0.00001 Par Value		Common Stock \$0.00001 Par Value		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Value	Shares	Value			
<b>Balance at December 31, 2014</b>	—	—	22,992,273	—	\$ 522,800	\$ (399,084)	\$ 123,716
Net loss	—	—	—	—	—	(6,417)	(6,417)
Stock compensation expense	—	—	—	—	5,413	—	5,413
Issuance of restricted stock	—	—	132,130	—	—	—	—
Vesting of restricted stock units	—	—	60,449	—	(238)	—	(238)
<b>Balance at December 31, 2015</b>	—	\$ —	23,184,852	\$ —	\$ 527,975	\$ (405,501)	\$ 122,474
Net loss	—	—	—	—	—	(12,023)	(12,023)
Stock compensation expense	—	—	—	—	5,313	—	5,313
Issuance of restricted stock	—	—	75,152	—	—	—	—
Vesting of restricted stock units	—	—	109,834	—	(200)	—	(200)
<b>Balance at December 31, 2016</b>	—	\$ —	23,369,838	\$ —	\$ 533,088	\$ (417,524)	\$ 115,564
Net loss	—	—	—	—	—	(19,321)	(19,321)
Adoption of new accounting standard	—	—	—	—	300	(300)	—
Stock compensation expense	—	—	—	—	5,091	—	5,091
Issuance of restricted stock	—	—	86,023	—	—	—	—
Retirement of restricted stock	—	—	(12,289)	—	—	—	—
Vesting of restricted stock units	—	—	199,617	—	(391)	—	(391)
<b>Balance at December 31, 2017</b>	—	\$ —	23,643,189	\$ —	\$ 538,088	\$ (437,145)	\$ 100,943

See accompanying notes to consolidated financial statements.

ASPEN AEROGELS, INC.

Consolidated Statements of Cash Flows

	Year Ended December 31,		
	2017	2016	2015
	(In thousands)		
<b>Cash flows from operating activities:</b>			
Net loss	\$ (19,321)	\$ (12,023)	\$ (6,417)
Adjustments to reconcile net loss to net cash (used in) provided by operating activities:			
Depreciation and amortization	10,753	9,853	9,887
Postponed financing costs	—	656	—
Stock compensation expense	5,091	5,313	5,413
Lease incentives	(111)	—	—
Other	(1)	—	(139)
Changes in operating assets and liabilities:			
Accounts receivable	(8,704)	3,089	(2,644)
Inventories	3,953	(6,336)	(1,635)
Prepaid expenses and other assets	411	(19)	(881)
Accounts payable	1,269	105	1,517
Accrued expenses	1,821	(2,178)	(227)
Deferred revenue	261	362	333
Other liabilities	(28)	600	152
Net cash (used in) provided by operating activities	(4,606)	(578)	5,359
<b>Cash flows from investing activities:</b>			
Capital expenditures	(6,118)	(13,216)	(21,956)
Purchase of marketable securities	—	—	(2,500)
Maturity and sale of marketable securities	—	—	2,500
Net cash used in investing activities	(6,118)	(13,216)	(21,956)
<b>Cash flows from financing activities:</b>			
Proceeds from borrowings under line of credit	27,250	—	—
Repayment of borrowings under line of credit	(23,500)	—	—
Postponed financing costs	—	(656)	—
Repayment of obligations under capital lease	(27)	(68)	(80)
Payments made for employee restricted stock minimum tax withholdings	(391)	(200)	(238)
Net cash (used in) provided by financing activities	3,332	(924)	(318)
Net (decrease) increase in cash	(7,392)	(14,718)	(16,915)
Cash and cash equivalents at beginning of period	18,086	32,804	49,719
Cash and cash equivalents at end of period	\$ 10,694	\$ 18,086	\$ 32,804
<b>Supplemental disclosures of cash flow information:</b>			
Interest paid	\$ 220	\$ 196	\$ 198
Income taxes paid	\$ —	\$ —	\$ —
<b>Supplemental disclosures of non-cash activities:</b>			
Changes in accrued capital expenditures	\$ (3,681)	\$ 2,116	\$ (5,332)
Capital lease	\$ —	\$ —	\$ 21

See accompanying notes to consolidated financial statements.

## ASPEN AEROGELS, INC.

### NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

#### (1) Description of Business

##### *Nature of Business*

Aspen Aerogels, Inc. (the Company) is an aerogel technology company that designs, develops and manufactures innovative, high-performance aerogel insulation used primarily in the energy infrastructure and building materials markets. The Company also conducts research and development related to aerogel technology supported by funding from several agencies of the U.S. government and other institutions in the form of research and development contracts.

The Company maintains its corporate offices in Northborough, Massachusetts. The Company has three wholly owned subsidiaries: Aspen Aerogels Rhode Island, LLC, Aspen Aerogels Germany, GmbH and Aspen Aerogels Georgia, LLC.

On June 18, 2014, the Company completed the initial public offering (IPO) of its common stock.

##### *Liquidity*

In August 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2014-15, Presentation of Financial Statements-Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern. (ASU 2015-14). This ASU requires management to assess and evaluate whether conditions or events exist, considered in the aggregate, that raise substantial doubt about the entity's ability to continue as a going concern within one year after the financial statements issue date. This standard is effective for annual periods ending after December 15, 2016. The Company adopted this standard effective January 1, 2017.

During the year ended 2017, the Company incurred a net loss of \$19.3 million, used \$4.6 million of cash in operations and had a net cash balance of \$6.9 million, after giving effect to the \$3.8 million in outstanding borrowings under its revolving line of credit (see note 6). The existing revolving line of credit matures on April 28, 2018.

The Company is making investments to increase capacity at its existing manufacturing facility in East Providence, Rhode Island, for the planned manufacturing facility in Statesboro, Georgia and to expand its sales and marketing efforts. The Company expects its existing cash balance, the \$5.0 million prepayment under its amended customer supply agreement (see note 9) and anticipated credit will be sufficient to fund these investments. The Company has no mitigating plans in place to reduce its cash expenditures under its current operating plan.

#### (2) Summary of Basis of Presentation and Significant Accounting Policies

##### *Principles of Consolidation*

The accompanying consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP), include the accounts of the Company and its wholly owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

##### *Use of Estimates*

The preparation of the consolidated financial statements requires the Company to make a number of estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Significant items subject to such estimates and assumptions include allowances for doubtful accounts, sales returns and allowances, product warranty costs, inventory valuation, the carrying amount of property and equipment, stock-based compensation and deferred income taxes. The Company evaluates its estimates and assumptions on an on-going basis using historical experience and other factors, including the current economic environment, which are believed to be reasonable under the circumstances. Management adjusts such estimates and assumptions when facts and circumstances warrant. Illiquid credit markets, volatile equity markets and declines in business investment can increase the uncertainty inherent in such estimates and assumptions. As future events and their effects cannot be determined with precision, actual results could differ

significantly from these estimates. Changes in these estimates resulting from continuing changes in the economic environment will be reflected in the financial statements in future periods.

### ***Cash and Cash Equivalents***

Cash equivalents include short-term, highly liquid instruments, which consist of money market accounts. All cash and cash equivalents are maintained with major financial institutions in North America. Deposits with these financial institutions may exceed the amount of insurance provided on such deposits; however, these deposits typically may be redeemed upon demand and, therefore, bear minimal risk.

### ***Marketable Securities***

Marketable securities consisted primarily of marketable debt securities which are classified as available-for-sale and are carried at fair value. The Company held no marketable securities as of December 31, 2017 or 2016. During the year ended December 31, 2015, the Company purchased \$2.5 million of marketable securities which matured during the same period. The unrealized gains and losses on available-for-sale securities are recorded in accumulated other comprehensive income (loss). The Company considers all highly liquid investments with maturities of 90 days or less at the time of purchase to be cash equivalents, and investments with maturities of greater than 90 days at the time of purchase to be marketable securities. When a marketable security incurs a significant unrealized loss for a sustained period of time, the Company will review the instrument to determine if it is other-than-temporarily impaired. If it is determined that an instrument is other-than-temporarily impaired, the Company will record the unrealized loss in the consolidated statement of operations.

### ***Concentration of Credit Risk***

Financial instruments, which potentially expose the Company to concentrations of credit risk, consist principally of accounts receivable. The Company's customers are primarily insulation distributors, insulation contractors, insulation fabricators and select end-users located throughout the world. The Company performs ongoing credit evaluations of its customers' financial condition and generally requires no collateral to secure accounts receivable. The Company maintains an allowance for doubtful accounts based on its assessment of the collectability of accounts receivable. The Company reviews the allowance for doubtful accounts quarterly. During the year ended December 31, 2017, the Company wrote off \$0.5 million of accounts receivable related to a single customer. The Company has not experienced any other meaningful non-payment or write-offs of accounts receivable. Accordingly, the allowance for doubtful accounts was zero at December 31, 2017 and 2016. The Company does not have any off-balance-sheet credit exposure related to its customers.

For the year ended December 31, 2017, two customers represented 15% and 12% of total revenue, respectively. For the year ended December 31, 2016, two customers represented 25% and 15% of total revenue, respectively. For the year ended December 31, 2015, two customers represented 14% and 12% of total revenue, respectively.

At December 31, 2017, the Company had three customers that accounted for 19%, 14% and 11% of accounts receivable, respectively. At December 31, 2016, the Company had three customers that accounted for 31%, 17% and 10% of accounts receivable, respectively.

### ***Inventories***

Inventory consists of finished products and raw materials. Inventories are carried at lower of cost, determined using the first-in, first-out (FIFO) method, and net realizable value. Cost includes materials, labor and manufacturing overhead. Manufacturing overhead is allocated to the costs of conversion based on normal capacity of the Company's production facility. Abnormal freight, handling costs and material waste is expensed in the period it occurs.

The Company periodically reviews its inventories and makes provisions as necessary for estimated excess, obsolete or damaged goods to ensure values approximate the lower of cost and net realizable value. The amount of any such provision is equal to the difference between the cost of inventory and the estimated net realizable value based upon assumptions about future demand, selling prices and market conditions.

### ***Property, Plant and Equipment, Net***

Property, plant and equipment are stated at cost. Assets held under capital leases are stated at the lesser of the present value of future minimum payments, using the Company's incremental borrowing rate, or the fair value of the property at the inception of the

lease. Expenditures for maintenance and repairs are charged to expense as incurred, whereas major betterments are capitalized as additions to property, plant and equipment.

Depreciation on plant and equipment is calculated on the straight-line method over the estimated useful lives of the assets. Assets related to capital leases are amortized on a straight-line basis over the shorter of the lease term or estimated useful life of the asset.

Assets utilized in the Company's operations that are taken out of service with no future use are charged to cost of sales or operating expenses, depending on the department in which the asset was utilized. Write-offs of construction in progress are charged to operating expenses upon the determination of no future use.

#### ***Other Assets***

Other assets primarily include long-term deposits.

#### ***Impairment of Long-Lived Assets***

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset or asset group may not be recoverable. Recognition and measurement of a potential impairment is performed on assets grouped with other assets and liabilities at the lowest level where identifiable cash flows are largely independent of the cash flows of other assets and liabilities. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset or asset group to future undiscounted net cash flows expected to be generated by the asset or asset group. If the carrying amount of an asset or asset group exceeds its estimated undiscounted future cash flows, an impairment charge is recognized for the amount by which the carrying amount of the asset or asset group exceeds the fair value of the asset or asset group. Fair value is determined through various valuation techniques including discounted cash flow models, quoted market values and third-party independent appraisals, as considered necessary.

#### ***Asset Retirement Obligations***

During the year ended December 31, 2016, the Company recorded an asset retirement obligation associated with its lease obligations and the retirement of tangible long-lived assets. The Company reviews legal obligations associated with the retirement of long-lived assets that result from contractual obligations or the acquisition, construction, development and/or normal use of the assets. If it is determined that a legal obligation exists, regardless of whether the obligation is conditional on a future event, the fair value of the liability for an asset retirement obligation is recognized in the period in which it is incurred, if a reasonable estimate of fair value can be made. An amount equal to the fair value of the liability is also recorded as a long-term asset that is depreciated over the estimated life of the asset. The difference between the gross expected future cash outflow and its present value is accreted over the life of the related lease as an operating expense. The Company fully satisfied its asset retirement obligation during the year ended December 31, 2016.

#### ***Deferred Revenue***

The Company records deferred revenue for product sales when (i) the Company has delivered products but other revenue recognition criteria have not been satisfied or (ii) payments have been received in advance of products being delivered.

#### ***Deferred Rent***

For leases that contain fixed increases in the minimum annual lease payment during the original term of the lease, the Company recognizes rental expense on a straight-line basis over the lease term, and records the difference between rent expense and the amount currently payable as deferred rent. Lease incentives for allowances for qualified leasehold improvements received from landlords are amortized on a straight-line basis over the lease term. The short-term portion of deferred rent is included within accrued expenses on the consolidated balance sheet.

#### ***Revenue Recognition***

The Company recognizes revenue from the sale of products and performance of research and development services. Revenue is recognized when all of the following criteria are met: persuasive evidence of an arrangement exists, the price to the buyer is fixed or determinable, delivery has occurred or services have been provided, and collectability is reasonably assured.

### ***Product Revenue***

Product revenue is recognized upon transfer of title and risk of loss, which is upon shipment or delivery. The Company's customary shipping terms are free on board shipping point.

Sales returns are recorded based on historical sales and return information. Products that exhibit unusual sales return patterns due to quality or other manufacturing matters are specifically investigated and analyzed as part of the sales return accrual. The sales return accrual represents a reserve for products that may be returned due to quality concerns or authorized for destruction in the field. Sales return reserves are recorded at full original sales value. The Company rarely exchanges products from inventory for returned products. Sales return reserves were \$0.1 million at December 31, 2017 and 2016.

For initial shipments of products where the Company is unsure of meeting the customer's specifications, the Company will defer the recognition of product revenue and related costs until written customer acceptance is obtained.

### ***Research Services Revenue***

The Company performs research services under contracts with various government agencies and other institutions. The Company records revenue earned on research services contracts using the percentage-of-completion method in two ways: (1) for firm-fixed-price contracts, the Company accrues that portion of the total contract price that is allocable, on the basis of the Company's estimates of costs incurred to date to total contract costs; and (2) for cost-plus-fixed-fee contracts, the Company records revenue that is equal to total payroll cost incurred times a stated factor plus reimbursable expenses, to a stated upper limit. The primary cost under the Company's research service contracts is the labor effort expended in completing the research, and the only deliverable, other than the labor hours expended, is reporting of research results to the customer. Because the input measure of labor hours expended is also reflective of the output measure, it is a reliable means to measure the extent of progress toward completion. Revisions in cost estimates and fees during the course of the contract are reflected in the accounting period in which the facts that require the revisions become known. Contract costs and rates used to allocate overhead to contracts are subject to audit by the respective contracting government agency. Adjustments to revenue as a result of audit are recorded in the period they become known. To date, adjustments to revenue as a result of audit have been insignificant.

### ***Warranty***

The Company provides warranties for its products and records the estimated cost within cost of sales in the period that the related revenue is recorded. The Company's standard warranty period extends to one year from the date of shipment. This standard warranty provides that the Company's products will be free from defects in material and workmanship, and will, under normal use, conform to the specifications for the product.

The Company's products may be utilized in systems that involve new technical demands and new configurations. Accordingly, the Company regularly reviews and assesses whether warranty reserves should be recorded in the period the related revenue is recorded. For an initial shipment of product for use in a system with new technical demands or new configurations and where the Company is unsure of meeting the customer's specifications, the Company will defer the recognition of product revenue and related costs until written customer acceptance is obtained.

During the year ended December 31, 2017 and 2016, the Company recorded warranty expense of \$0.9 million and \$0.5 million, respectively. These specific warranty charges were related to product claims for two separate product application issues. These claims were outside of the Company's typical experience. As of December 31, 2017, the Company had satisfied all outstanding warranty claims.

### ***Shipping and Handling Costs***

Shipping and handling costs are classified as a component of cost of revenue. Customer payments of shipping and handling costs are recorded as product revenue.

### ***Stock-based Compensation***

The Company grants share-based awards to its employees and non-employee directors. All share-based awards granted, including grants of stock options, restricted stock and restricted stock units (RSUs), are recognized in the statement of operations based on their fair value as of the date of grant. Expense is recognized on a straight-line basis over the requisite service period for all awards with service conditions. For performance-based awards, the grant date fair value is recognized as expense when the condition is probable of being achieved, and then on a graded basis over the requisite service period. The Company uses the Black-Scholes

option-pricing model to determine the fair value of service-based option awards. The Black-Scholes model requires the use of a number of complex and subjective assumptions including fair value of the underlying security, the expected volatility of the underlying security, a risk-free interest rate and the expected term of the option.

The fair value of restricted stock and RSUs is determined using the closing price of the Company's common stock on the date of grant. All shares of restricted stock are not transferable until vested. Restricted stock is typically issued to non-employee directors and typically vests over a one-year period from the date of issuance. RSUs are issued to employees and typically vest over a three to four year period from the date of issuance. The fair value of restricted stock and RSUs upon which vesting is solely service-based is expensed ratably over the vesting period. If the service condition for shares of restricted stock is not met for any reason, the shares of unvested restricted stock will be forfeited and returned to the Company.

For stock options that contain a market condition, the Company uses the Monte-Carlo simulation option-pricing model to determine the fair value of the awards. In addition to the input assumptions used in the Black-Scholes model, the Monte-Carlo simulation option-pricing model factors the probability that the specific market condition may or may not be satisfied into the valuation. Stock-based compensation expense for awards with a market condition is recognized on a straight-line basis over the requisite service period for each such award.

Pursuant to the evergreen provisions of the 2014 Employee, Director and Consultant Equity Incentive Plan, the number of shares of common stock authorized for issuance under the plan automatically increased by 467,396 shares to 6,536,597 shares effective January 1, 2017.

### ***Research and Development***

Costs incurred in the research and development of the Company's products include compensation and related costs, services provided by third-party contractors, materials and supplies and are classified as research and development expenses as incurred. Research and development costs directly associated with research services revenue are classified as research services in cost of revenue.

### ***Earnings per Share***

The Company calculates net loss per common share based on the weighted-average number of common shares outstanding during each period. Potential common stock equivalents are determined using the treasury stock method. The weighted-average number of common shares included in the computation of diluted net income (loss) gives effect to all potentially dilutive common equivalent shares, including outstanding stock options, RSUs and warrants. Common equivalent shares are excluded from the computation of diluted net loss per share if their effect is antidilutive.

### ***Income Taxes***

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date.

The Company recognizes the effect of income tax positions only if those positions are more likely than not of being sustained. The Company accounts for uncertain tax positions using a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. Differences between tax positions taken in a tax return and amounts recognized in the financial statements are recorded as adjustments to income taxes payable or receivable, or adjustments to deferred taxes, or both. Changes in recognition or measurement are reflected in the period in which the change in judgment occurs. The Company recognizes penalties and interest related to uncertain tax positions, if any, as a component of income tax expense.

### ***Segments***

Operating segments are identified as components of an enterprise about which separate, discrete financial information is available for evaluation by the chief operating decision maker in making decisions on how to allocate resources and assess performance. The Company's chief operating decision maker is the Chief Executive Officer. The Company's chief operating decision

maker reviews consolidated operating results to make decisions about allocating resources and assessing performance for the entire Company. The Company views its operations and manages its business as one operating segment.

Information about the Company's total revenues, based on shipment destination or services location, is presented in the following table:

	Year Ended December 31,		
	2017	2016	2015
	(In thousands)		
Revenue:			
U.S.	\$ 51,439	\$ 35,726	\$ 44,553
International	60,192	82,012	77,965
Total	<u>\$ 111,631</u>	<u>\$ 117,738</u>	<u>\$ 122,518</u>

### ***Recently Issued Accounting Standards***

From time to time, new accounting pronouncements are issued by the FASB or other standard setting bodies. Recently issued standards typically do not require adoption until a future effective date. Prior to their effective date, the Company evaluates the pronouncements to determine the potential effects of adoption to its consolidated financial statements.

### ***Standards Implemented After December 31, 2016***

In July 2015, the FASB issued ASU 2015-11, Inventory (Topic 330), which, for entities that do not measure inventory using the last-in, first-out (LIFO) or retail inventory method, changes the measurement principle for inventory from the lower of cost or market to lower of cost and net realizable value. The ASU also eliminates the requirement for these entities to consider replacement cost or net realizable value less an approximately normal profit margin when measuring inventory. Public entities are required to apply the standard for fiscal years beginning after December 15, 2016, including interim periods within those fiscal periods. The Company adopted this standard effective January 1, 2017. Application of the standard has not resulted in any material impact to the Company's consolidated financial statements or other disclosures.

In March 2016, the FASB issued ASU 2016-09, Compensation – Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting. The amendment simplifies several aspects of the accounting for share-based payment transactions including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. For public entities, the amendments in ASU 2016-09 are effective for interim and annual reporting periods beginning after December 15, 2016. The Company adopted this standard effective January 1, 2017. The provisions of ASU 2016-09 related to the timing of accounting for the forfeitures of share based awards was adopted using a modified retrospective method by means of a cumulative-effect adjustment to equity as of January 1, 2017 of \$0.3 million. The other provisions of ASU 2016-09 were adopted prospectively.

### ***Standards to be Implemented After December 31, 2017***

In August 2015, the FASB issued a deferral of ASU 2014-09, Revenue from Contracts with Customers. The standard replaces the transaction- and industry-specific revenue recognition guidance under current U.S. GAAP with a principle based approach for determining revenue recognition. As a result of the deferral, public entities are required to apply the revised revenue recognition standard for the annual reporting period beginning on or after December 15, 2017, including interim periods within that annual reporting period. The Company will adopt this standard using the modified retrospective method on January 1, 2018. The Company completed its analysis of the new revenue standard and determined that it will not materially impact the allocation and timing of recognition of previously reported revenues from the sale of products or performance of research and development services. In addition, the Company determined that there are no incremental contracts costs or contract fulfillment costs to be recognized in connection with the adoption. Based on the Company's analysis, no adjustment to retained earnings will be required as of the January 1, 2018 adoption date. Accordingly, the Company's application of the standard is not expected to have a material impact on the Company's consolidated balance sheet at January 1, 2018 and will not have a material impact to our statement of operations. Additional disclosures will be required in future filings.

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842). FASB ASU 2016-02 modifies the accounting for leases and requires that all leases be recorded on the consolidated balance sheets as assets and liabilities. This update is effective for fiscal years beginning after December 15, 2018. Early application is permitted. The Company has not yet selected a transition method and is evaluating the effect the updated standard will have on its consolidated financial statements and related disclosures. The Company



currently expects that most of its operating lease commitments will be subject to the new standard and recognized as right-of-use assets and operating lease liabilities. The Company expects application of the standard will increase the reported value of both total assets and total liabilities upon adoption and will have a material impact on the Company's consolidated financial statements and other disclosures.

In August 2016, the FASB issued ASU 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments (ASU 2016-15). This amendment addresses eight classification issues related to the statement of cash flows. The amendments in ASU 2016-15 are effective for public business entities for annual and interim periods in fiscal years beginning after December 15, 2017. Early adoption is permitted, including adoption in an interim period. The Company has completed its assessment of the amendment and has determined that adoption will not have a significant impact on the Company's consolidated financial statements or other disclosures. The Company will adopt the provisions of the amendment effective January 1, 2018.

### (3) Inventories

Inventories consist of the following:

	<b>December 31,</b>	
	<b>2017</b>	<b>2016</b>
	<b>(In thousands)</b>	
Raw material	\$ 2,543	\$ 3,511
Finished goods	6,372	9,357
Total	<u>\$ 8,915</u>	<u>\$ 12,868</u>

### (4) Property, Plant and Equipment, Net

Property, plant and equipment consist of the following:

	<b>December 31,</b>		<b>Useful life</b>
	<b>2017</b>	<b>2016</b>	
	<b>(In thousands)</b>		
Construction in progress	\$ 7,699	\$ 11,139	—
Buildings	24,013	23,901	30 years
Machinery and equipment	118,786	113,659	3 — 10 years
Computer equipment and software	8,099	7,679	3 years
Total	158,597	156,378	
Accumulated depreciation and amortization	(82,530)	(71,984)	
Property, plant and equipment, net	<u>\$ 76,067</u>	<u>\$ 84,394</u>	

Plant and equipment under capital leases was less than \$0.1 million at both December 31, 2017 and 2016.

Depreciation expense was \$10.8 million, \$9.8 million and \$9.8 million for the years ended December 31, 2017, 2016 and 2015, respectively. Amortization associated with assets under capital leases was less than \$0.1 million for each of the years ended December 31, 2017, 2016 and 2015.

Construction in progress totaled \$7.7 million and \$11.1 million at December 31, 2017 and 2016, respectively, which included engineering designs and other pre-construction costs for the planned manufacturing facility in Statesboro, Georgia of \$7.2 million at both December 31, 2017 and 2016. The Company assessed the engineering designs and pre-construction costs associated with the planned manufacturing facility and determined that the assets remain technologically feasible as of December 31, 2017.

The Company has delayed the project to construct the Statesboro, Georgia manufacturing facility to better align the timing of this capacity expansion with the Company's assessment of future demand.

## (5) Accrued Expenses

Accrued expenses consist of the following:

	<u>December 31,</u>	
	<u>2017</u>	<u>2016</u>
	(In thousands)	
Employee compensation	\$ 4,633	\$ 2,796
Other accrued expenses	1,229	1,191
	<u>\$ 5,862</u>	<u>\$ 3,987</u>

## (6) Revolving Line of Credit

The Company entered into an Amended and Restated Loan and Security Agreement with Silicon Valley Bank (Loan Agreement), on August 31, 2014, which has been subsequently amended from time to time. On January 25, 2018, the Loan Agreement was amended to extend the maturity date of the facility to April 28, 2018. Under the Loan Agreement, the Company may borrow up to \$20.0 million subject to compliance with certain covenants and borrowing base limitations. At the Company's election, the interest rate applicable to borrowings may be based on the prime rate or LIBOR. Prime rate-based rates vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum, while LIBOR-based rates vary from LIBOR plus 3.75% per annum to LIBOR plus 4.25% per annum. In addition, the Company is required to pay a monthly unused line fee of 0.5% per annum of the average unused portion of the facility. Obligations under the Loan Agreement are secured by a security interest in all assets of the Company, including those at the East Providence facility, except for certain exclusions.

During the year ended December 31, 2017, the Company borrowed \$27.3 million and repaid \$23.5 million under the line of credit. At December 31, 2017 and 2016, the Company had \$3.8 million and \$0.0 million drawn on the revolving credit facility. Under the Loan Agreement, the Company is required to comply with both non-financial and financial covenants, including minimum Adjusted EBITDA and minimum Adjusted Quick Ratio covenants, as defined. At December 31, 2017, the Company was in compliance with all such covenants.

The Company has been required to provide letters of credit to secure obligations under certain commercial contracts and real property leases. The Company had outstanding letters of credit backed by the revolving credit facility of \$2.3 million and \$2.7 million at December 31, 2017 and 2016, respectively, which reduce the funds otherwise available to the Company under the facility.

At December 31, 2017, the effective amount available to the Company under the revolving credit facility was \$13.9 million after giving effect to the \$3.8 million in outstanding borrowings and \$2.3 million of outstanding letters of credit.

## (7) Other Expense, net

For the year ended December 31, 2017, other expense, net of \$0.2 million consisted primarily of fees and interest expense related to the Company's revolving credit facility with Silicon Valley Bank.

For the year ended December 31, 2016, other expense, net of \$0.8 million consisted of financing costs and interest expense. During the year, the Company engaged with a third party lender to secure a term loan to fund a portion of the construction of the planned manufacturing facility in Statesboro, Georgia. In 2016, the Company decided to delay construction of the facility and its related financing to better align the timing of this capacity expansion with the Company's assessment of future demand. As a result, the Company recorded a \$0.7 million charge for postponed financing costs. The charge included legal fees incurred directly by the Company and on behalf of the potential lender. In addition, the Company recognized fees of \$0.1 million associated with the revolving credit facility.

For the year ended December 31, 2015, other expense, net consisted primarily of fees associated with the revolving credit facility of \$0.2 million.

## (8) Deferred Rent

Deferred rent is comprised as follows:

	December 31,	
	2017	2016
	(In thousands)	
Deferred rent	\$ 1,511	\$ 1,125
Current maturities of deferred rent	(208)	(154)
Deferred rent, less current maturities	<u>\$ 1,303</u>	<u>\$ 971</u>

On June 29, 2016, the Company executed a new agreement to extend its lease of the Northborough, Massachusetts facility through December 31, 2026. As part of the new agreement, the Company's obligation to perform certain activities upon the termination of the prior lease was eliminated. The settlement of the asset retirement obligation balance of approximately \$0.2 million was reclassified to other long-term liabilities and will be amortized as a reduction to rent expense over the term of the new lease agreement.

## (9) Commitments and Contingencies

### Operating Leases

During 2016, the Company entered into an agreement to extend its lease of approximately 51,650 square feet of office space in Northborough, Massachusetts. The lease commenced on January 1, 2017 and will expire on December 31, 2026. The annual base rent associated with the lease was \$408,000 during 2017 and will increase by approximately 3% annually for the term of the lease. The lease also requires the payment by the Company of its pro rata share of real estate taxes and certain other expenses. Prior to the expiration of the lease, the Company will have the right to extend the lease for an additional term of three years.

Under the terms of the new lease, the landlord provided the Company with an allowance of \$1.2 million to be utilized for improvements to the leased premises. These amounts are recorded as a component of deferred rent in determining the minimum lease payments for the property. As of December 31, 2017 and 2016, the Company had capitalized \$1.2 million and \$0.7 million in associated leasehold improvement costs, respectively.

The Company also leases facilities and equipment under operating leases expiring at various dates through 2021. Under these agreements, the Company is obligated to pay annual rent, real estate taxes, and certain operating expenses.

Future minimum lease payments under operating leases at December 31, 2017 are as follows:

Year	Operating Leases
	(In thousands)
2018	\$ 1,335
2019	909
2020	687
2021	535
2022	473
Thereafter	2,039
Total minimum lease payments	<u>\$ 5,978</u>

The Company incurred rent expense under all operating leases of approximately \$1.4 million, \$1.5 million and \$1.6 million in the years ended December 31, 2017, 2016 and 2015, respectively.

### Letters of Credit

The Company has been required to provide certain customers with letters of credit securing obligations under commercial contracts. The Company had letters of credit outstanding of \$2.3 million and \$2.7 million at December 31, 2017 and 2016, respectively. These letters of credit are secured by the Company's revolving credit facility (see note 6).

### ***Customer Supply Agreement***

The Company is party to a supply agreement, as amended, with BASF Polyurethanes GmbH (BASF) (the Supply Agreement) and a joint development agreement with BASF SE (the JDA). Pursuant to the Supply Agreement, the Company will sell exclusively to BASF the Company's Spaceloft A2 product at annual volumes to be specified by BASF, subject to certain volume limits. The Supply Agreement will terminate on December 31, 2027. Upon expiration of the Supply Agreement, the Company will be subject to a post-termination supply commitment for an additional two years. The JDA is designed to facilitate the collaboration between the parties on the development and commercialization of new products.

In addition, BASF, in its sole discretion, may make prepayments to the Company in the aggregate amount of up to \$22 million during the term of the Supply Agreement. BASF has agreed to make a prepayment in the amount of \$5 million to the Company in two equal installments in 2018 (the 2018 Prepayment). The amounts and terms of additional prepayment installments, if any, are subject to negotiation between the Company and BASF.

After January 1, 2019, the Company will, at BASF's instruction, credit up to 25.3% of any amounts invoiced by the Company for Spaceloft A2 product sold to BASF against the prepayment balance. However, BASF has no obligation to purchase products under the Supply Agreement. If any of the 2018 Prepayment remains uncredited as of December 31, 2021, BASF may request that the Company repay the uncredited amount to BASF. The prepayment obligation is secured by a security interest in real estate, plant and equipment at the Company's Rhode Island facility and a license to certain intellectual property.

### ***Litigation***

The Company is, from time to time, a party to litigation that arises in the normal course of its business operations. See Part I, Item 3 ("Legal Proceedings") of this Annual Report on Form 10-K for a description of certain of the Company's current legal proceedings. The Company is not presently a party to any litigation for which it believes a loss is probable requiring an amount to be accrued or a possible loss contingency requiring disclosure.

### **(10) Stockholders' Equity**

At December 31, 2017 and 2016, the Company was authorized to issue 130,000,000 shares of stock, of which 125,000,000 shares were designated as common stock and 5,000,000 shares were designated as preferred stock.

### **(11) Employee Benefit Plan**

The Company sponsors the Aspen Aerogels, Inc. 401(k) Plan. Under the terms of the plan, the Company's employees may contribute a percentage of their pretax earnings. During the years ended December 31, 2017, 2016 and 2015, the Company provided matching contributions of \$0.2 million, \$0.2 million and \$0.1 million, respectively.

### **(12) Employee Stock Ownership Plans**

Effective June 12, 2014, the Company adopted the 2014 Employee, Director and Consultant Equity Incentive Plan (the 2014 Equity Plan). Under the 2014 Equity Plan, the Company may grant incentive stock options (ISOs), non-qualified stock options (NSOs), restricted stock, restricted stock units (RSUs) and other stock-based awards. Stock options under the plan are to be granted with an exercise price not less than the fair market value of the Company's common stock at the date of grant. Equity awards granted to employees generally vest over a service period of three to four years. Restricted stock and stock options granted to nonemployee directors generally vest over a one year service period.

During 2017, the Company granted 86,023 shares of restricted common stock with a grant date fair value of \$0.4 million and NSOs to purchase 119,133 shares of common stock with a grant date fair value of \$0.2 million to its non-employee directors. The awards to non-employee directors during 2017 will vest over a period of one year. The Company also granted 481,373 RSUs and NSOs to purchase 320,571 shares of common stock to employees. The RSUs and NSOs granted to employees during 2017 will vest over a three year period. All awards to nonemployee directors and employees during 2017 were granted under the 2014 Equity Plan.

On December 11, 2015, the Company issued certain equity grants to its chief executive officer which included 78,125 shares of restricted stock, NSOs to purchase 84,745 shares of common stock vesting solely over three years and NSOs to purchase 370,181 shares of common stock vesting subject to certain common stock price target achievements, as defined, over a three to five year period (the CEO Options). Collectively, these equity grants had an aggregate fair value of \$2.0 million at the time of grant. The restricted stock award will vest based on achievement of a Company financial performance target for fiscal year 2020.

On August 2, 2017, the Company modified the performance target for the year ending December 31, 2020 with respect to 78,125 shares of restricted stock held by its chief executive officer. In addition, the Company modified the vesting conditions of NSOs held by its chief executive officer to purchase 131,578 and 122,324 shares of common stock to extend the time period to achieve certain common stock price targets by an additional year to four and five years from the date of grant, respectively.

The Company accounted for the extension of the time periods for the achievement of the common stock price target vesting conditions of the NSOs as modifications in determining the stock-based compensation expense to be recognized over the remaining service period. The total incremental compensation expense resulting from the modification was \$0.1 million. The incremental compensation expense associated with these awards will be recognized over the remaining service period of the awards.

Stock-based compensation is included in cost of sales or operating expenses, as applicable, and consists of the following:

	Year Ended December 31,		
	2017	2016	2015
	(In thousands)		
Cost of product revenue	\$ 790	\$ 796	\$ 824
Research and development expenses	555	594	666
Sales and marketing expenses	1,096	1,066	1,012
General and administrative expenses	2,650	2,857	2,911
Total stock-based compensation	<u>\$ 5,091</u>	<u>\$ 5,313</u>	<u>\$ 5,413</u>

At December 31, 2017, 3,170,009 shares of common stock were reserved for issuance upon the exercise or vesting, as appropriate, of outstanding stock-based awards granted under the 2014 Equity Plan. In addition, at December 31, 2017, 90,288 shares of common stock were reserved issuance upon the exercise of outstanding options granted under the Company's 2001 Equity Incentive Plan, as amended (the 2001 Equity Plan). Any cancellations or forfeitures of the options outstanding under the 2001 Equity Plan will result in the shares reserved for issuance upon exercise or such options becoming available for grant under the 2014 Equity Plan. At December 31, 2017, there were 2,402,555 shares available for future grant under the 2014 Equity Plan.

#### ***Stock Options Valuation and Amortization Method***

The fair value of each stock option is estimated as of the date of grant using the Black-Scholes option pricing model. Key inputs into this formula included expected term, expected volatility, expected dividend yield and the risk-free rate. Each assumption is set forth and discussed below.

The Company used a Monte Carlo Simulation model to estimate the original grant date fair value of the CEO Options and the 2017 modification. The simulation model was based on the Black-Scholes option pricing model and a number of complex assumptions including (i) whether the vesting condition is satisfied within the time-vesting periods, and (ii) the date the common stock price target is met per the terms of the agreement.

For stock options with a service condition, the fair value is amortized on a straight-line basis over the requisite service period of the options, which is generally a three- to four-year vesting period from the date of grant.

#### ***Expected Term***

The expected term represents the period that the Company's stock-based awards are expected to be outstanding. The Company does not have sufficient historical exercise data to provide a reasonable basis upon which to estimate the expected term. Accordingly, the Company uses the simplified method to calculate the expected term for options granted.

#### ***Expected Volatility***

Due to the Company's limited historical data, the Company uses an estimated volatility based on the historical volatility of comparable companies with publicly available share prices. In 2017, 2016 and 2015, the expected volatility is based on the weighted average volatility of up to 17 companies with business, financial and market attributes that the Company believes are similar to its own.

#### ***Expected Dividend***

The Company uses an expected dividend yield of zero. The Company does not intend to pay cash dividends on its common stock in the foreseeable future, nor has it paid dividends on its common stock in the past.

### ***Risk-free Interest Rate***

The Company uses a risk-free interest rate based on U.S. Treasury zero-coupon issues with a remaining term equal to the expected life assumed at the date of grant.

### ***Estimated Forfeitures***

Effective January 1, 2017, the Company adopted the provisions of ASU 2016-09 related to the timing of accounting for the forfeitures of share based awards using a modified retrospective transition method. Under these provisions, the Company records the impact of forfeitures of service based awards at the time an award is forfeited. Adoption of the provisions resulted in a cumulative-effect adjustment to equity as of January 1, 2017 of \$0.3 million.

Prior to adopting ASU 2016-09, forfeitures were required to be estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates. Forfeitures were estimated based on voluntary termination behavior as well as analysis of actual option forfeitures. Accordingly, share-based compensation expense had been reduced by an estimated annual forfeiture rate for the years ended December 31, 2016 and 2015.

### ***Assumptions Utilized***

The following information relates to the fair value of the option awards estimated by use of the Black-Scholes option pricing model:

	Year Ended December 31,		
	2017	2016	2015
	(In thousands)		
Weighted average assumptions:			
Expected term (in years)	5.86	5.86	6.02
Expected volatility	51.95%	53.56%	57.95%
Risk free rate	1.99%	1.36%	1.79%
Expected dividend yield	0.00%	0.00%	0.00%
Weighted average fair value:			
Grant-date fair value of options granted	\$ 2.08	\$ 2.16	\$ 3.82
Grant-date fair value of options vested	\$ 3.98	\$ 7.58	\$ 11.89
Aggregate intrinsic value of options exercised	\$ —	\$ —	\$ —

### ***Outstanding Options***

The following table summarizes information about stock options outstanding:

	Number of Shares	Weighted Average Grant Date Fair Value Per Share	Weighted Average Exercise Price Per Share	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
		(\$ in thousands, except share and per share data)			
Options outstanding at December 31, 2016	2,063,574	\$ 8.26	\$ 11.80	8.30	\$ 36,326
Granted	439,704	\$ 2.08	\$ 4.14		
Forfeited	(70,372)	\$ 6.98	\$ 9.75		
Exercised	—	\$ —	\$ —		\$ —
Options outstanding at December 31, 2017	<u>2,432,906</u>	\$ 7.18	\$ 10.48	7.64	\$ 554,236
Exercisable at December 31, 2017	<u>1,156,129</u>	\$ 11.80	\$ 15.59	6.98	\$ —
Expected to vest at December 31, 2017	<u>1,276,777</u>	\$ 2.99	\$ 5.85	8.24	\$ 465,719

As of December 31, 2017, total unrecognized compensation cost related to non-vested service-based options granted under the 2014 Equity Plan was \$2.2 million. The unrecognized compensation cost for the service-based options is expected to be recognized over a weighted average period of 1.68 years.

### Restricted Stock Awards and Restricted Stock Units

The Company values restricted stock awards and RSUs based on the closing price of our shares on the date of grant. RSUs have time-based vesting conditions and typically vest over three or four years. Restricted stock awards issued to nonemployee directors generally vest in full one year from the date of grant.

Information related to grants of RSUs during 2017 is as follows:

	Restricted Stock Units	Weighted Average Grant Date Fair Value
Balance at December 31, 2016	682,085	\$ 5.83
Granted	481,373	4.14
Vested	(293,561)	6.67
Forfeited	(42,506)	4.91
Balance at December 31, 2017	<u>827,391</u>	<u>\$ 4.59</u>

Restricted stock awards granted during 2017 are considered issued and outstanding common stock and are excluded from the table above. As of December 31, 2017 there were 151,859 shares of restricted stock outstanding.

The total intrinsic value of restricted stock and RSUs that vested in 2017 and 2016 was \$1.4 million and \$0.6 million, respectively. As of December 31, 2017, 901,125 of the total shares of restricted stock and RSUs outstanding will vest upon the fulfillment of service conditions. In addition, 78,125 shares of restricted stock will vest only if a certain performance condition is achieved. As of December 31, 2017, the Company had determined that the performance-based condition was probable and \$0.1 million in compensation expense was recorded to date in conjunction with the award.

As of December 31, 2017, total unrecognized compensation cost related to restricted stock awards of \$0.1million, RSUs of \$2.3million and restricted stock with performance-based conditions of \$0.2 million is expected to be recognized over a weighted average period of 0.45 years, 1.68 years and 3.00 years, respectively.

### (13) Net Loss Per Share

The computation of basic and diluted net loss per share consists of the following:

	Year ended December 31,		
	2017	2016	2015
	(In thousands, except share and per share data)		
Numerator:			
Net loss	\$ (19,321)	\$ (12,023)	\$ (6,417)
Denominator:			
Weighted average shares outstanding, basic and diluted	<u>23,390,235</u>	<u>23,139,807</u>	<u>22,986,931</u>
Net loss per share, basic and diluted	<u>\$ (0.83)</u>	<u>\$ (0.52)</u>	<u>\$ (0.28)</u>

Potentially dilutive common shares that were excluded from the computation of diluted net loss per share because they were anti-dilutive consist of the following:

	Year ended December 31,		
	2017	2016	2015
Common stock options	2,432,906	2,063,574	1,702,337
Restricted common stock units	827,391	682,085	417,126
Common stock warrants	—	115	131
Restricted common stock awards	151,859	153,277	132,130
Total	<u>3,412,156</u>	<u>2,899,051</u>	<u>2,251,724</u>

In the table above, anti-dilutive shares consist of those common stock equivalents that have (i) an exercise price above the average stock price for the period or (ii) related average unrecognized stock compensation expense sufficient to buy back the entire amount of shares. The Company excludes the shares issued in connection with restricted stock awards from the calculation of basic weighted average common shares outstanding until the restrictions lapse.

As of December 31, 2017 and 2016, there was no dilutive impact of the common stock options, RSUs, common stock warrants and restricted stock awards.

#### (14) Income Taxes

The Company incurred net operating losses and recorded a full valuation allowance against net deferred assets for all periods presented. Accordingly, the Company has not recorded a provision for federal or state income taxes.

The reconciliation between the U.S. statutory income tax rate and the Company's effective rate consists of the following:

	Year Ended December 31,		
	2017	2016	2015
U.S. federal income tax statutory rate	35%	35%	35%
Permanent differences	(3)%	(4)%	(11)%
State tax, net of federal benefit	(5)%	(1)%	(6)%
Changes in valuation allowance for deferred tax assets	113%	(30)%	(11)%
Stock-based compensation	—%	(1)%	(8)%
2017 Tax Cuts and Jobs Act	(138)	—%	—%
Other	(2)%	1%	1%
Effective tax rate	—	—	—

The tax effects of temporary differences between financial statement and tax accounting that gave rise to significant portions of the Company's deferred tax assets and deferred tax liabilities at December 31, 2017 and 2016 are presented below:

	December 31,	
	2017	2016
(In thousands)		
Deferred tax assets:		
Net operating loss carryforwards	\$ 45,307	\$ 66,276
Stock-based compensation	4,719	6,140
Tax credit carryforwards	308	312
Reserves and accruals	492	398
Intangible assets and amortization	56	95
Total gross deferred tax assets	50,882	73,221
Deferred tax liabilities:		
Depreciation	(4,645)	(5,295)
Total deferred tax liabilities	(4,645)	(5,295)
Total deferred tax assets and liabilities	46,237	67,926
Valuation allowance	(46,237)	(67,926)
Net deferred tax asset	\$ —	\$ —

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act (TCJA) tax reform legislation. This legislation makes significant change in U.S. tax law including a reduction in the corporate tax rates, changes to net operating loss carryforwards and carrybacks, and a repeal of the corporate alternative minimum tax. The legislation reduced the U.S. corporate tax rate from the current rate of 34% to 21% for the year ending 2018. As a result of the enacted law, the Company was required to revalue deferred tax assets and liabilities at the 21% rate. This results in a decrease in the Company's net deferred tax asset and corresponding valuation allowance of \$26.7 million. As the Company maintains a full valuation allowance against its net deferred tax asset position in the United States, this revaluation does not result in an income tax expense or benefit in the current period. The provisions of the TCJA related to the one-time mandatory transition tax on deemed repatriation did not have an impact on the Company's results of operations during the year ended December 31, 2017. The other provisions of the TCJA did not have a material impact on the Company's 2017 consolidated financial statements.



The net change in the valuation allowance for the year ended December 31, 2017, was a decrease of \$ 21.7 million. The Company has recorded a full valuation allowance against its deferred tax assets due to the uncertainty associated with the utilization of the net operating loss carryforwards and other future deductible items. In assessing the realizability of deferred tax assets, the Company considers all available evidence, historical and prospective, with greater weight given to historical evidence, in determining whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of the Company's deferred tax assets generally is dependent upon generation of future taxable income.

At December 31, 2017, the Company has \$194.6 million of net operating losses available to offset future federal income, if any, and which expire on various dates through December 31, 2037.

For the year ended December 31, 2014, the Company performed an analysis pursuant to Internal Revenue Code Section 382, as well as similar state provisions, in order to determine whether any limitations might exist on the utilization of net operating losses and other tax attributes. Based on this analysis, the Company has determined that an ownership change occurred as a result of the June 2014 IPO, resulting in an annual limitation on the use of its net operating losses and other tax attributes as of such date. Net operating losses of \$113.2 million were determined to be available. The Company also determined that built-in gains of \$42.0 million existed at the date of the ownership change. Built-in gains increase the limitation under the Internal Revenue Code to the extent triggered during the five-year period subsequent to the date of change. Absent the disposition of certain built-in gain assets within the five-year period subsequent to the change in ownership, the entire \$42.0 million of net operating losses will expire in June 2019.

At December 31, 2017, the Company has \$76.7 million of apportioned net operating losses available to offset future state taxable income, if any, and which begin to expire at various dates between 2018 and 2037.

For each of the years ended December 31, 2017, 2016 and 2015, the Company did not have any material unrecognized tax benefits and thus no interest and penalties related to unrecognized tax benefits were recorded. In addition, the Company does not expect that the amount of unrecognized tax benefits will change significantly within the next twelve months.

The Company files a federal income tax return in the United States and income tax returns in various state and foreign jurisdictions. All tax years are open for examination by the taxing authorities for both federal and state purposes.

The Securities & Exchange Commission staff issued Staff Accounting Bulletin No. 118 (SAB 118) to address the tax reform legislation. In accordance with SAB 118, the Company has recognized the provisional tax impacts, outlined above, related to the re-measurement of its deferred income tax assets and liabilities associated with the one-time mandatory transition tax on deemed repatriation. Although the Company does not believe there will be any material adjustments in subsequent reporting periods, the ultimate impact may differ from the provisional amounts, due to, among other things, the significant complexity of the 2017 Tax Act and anticipated additional regulatory guidance that may be issued by the IRS, changes in analysis, interpretations and assumptions the Company has made and actions the Company may take as a result of the 2017 Tax Act.

#### **(15) Subsequent Events**

The Company has evaluated subsequent events through March 1, 2018, the date of issuance of the consolidated financial statements for the year ended December 31, 2017.

On January 25, 2018, the Company's Loan Agreement was amended to extend the maturity date of the facility to April 28, 2018 and includes the modification of certain financial covenants and the consent to the amendment of the supply agreement and side agreement with BASF.

On February 16, 2018, the Company amended and restated its existing supply agreement and side agreement with BASF. Among the amended terms of the agreement, BASF has agreed to remit prepayments in the aggregate amount of \$5 million to the Company in two installments during 2018. The Company will credit 25.3% of any amounts invoiced by the Company for product sold to BASF after January 1, 2019 against any remaining balance of the prepayments. Any remaining balance from the prepayments as of December 31, 2021, BASF may require that the Company repay such amount to BASF after December 31, 2021.

## QUARTERLY RESULTS OF OPERATIONS

	Three Months Ended			
	March 31,	June 30,	Sept 30,	Dec 31,
	(in thousands, except per share data) (unaudited)			
<b>2017</b>				
Total revenue	\$ 23,002	\$ 25,069	\$ 27,198	\$ 36,362
Gross profit	2,221	3,694	4,948	7,808
Loss from operations	(9,052)	(5,433)	(3,030)	(1,621)
Net loss	(9,078)	(5,472)	(3,088)	(1,683)
Net loss per share basic and diluted common share - basic	\$ (0.39)	\$ (0.23)	\$ (0.13)	\$ (0.07)
<b>2016</b>				
Total revenue	\$ 32,821	\$ 27,718	\$ 29,560	\$ 27,639
Gross profit	6,527	6,653	6,402	3,729
Loss from operations	(1,758)	(1,348)	(2,404)	(5,710)
Net loss	(1,797)	(1,387)	(3,097)	(5,742)
Net income loss per share basic and diluted common share - basic	\$ (0.08)	\$ (0.06)	\$ (0.13)	\$ (0.25)

**Schedule II**  
**VALUATION AND QUALIFYING ACCOUNTS**  
(in millions)

Description	Balance at Beginning of Year	Charges to Costs and Expenses (a)	Deductions to Allowances for Uncollectible Accounts (b)	Charges to (Deductions from) Other Accounts (c)	Balance at End of Year
<b>Year Ended December 31, 2017:</b>					
Allowances for uncollectible accounts and sales returns and allowances	\$ 93	—	—	—	\$ 93
<b>Year Ended December 31, 2016:</b>					
Allowances for uncollectible accounts and sales returns and allowances	\$ 89	—	—	4	\$ 93
<b>Year Ended December 31, 2015:</b>					
Allowances for uncollectible accounts and sales returns and allowances	\$ 120	—	—	(31)	\$ 89

(a) Represents allowances for uncollectible accounts established through selling, general and administrative expenses.

(b) Represents actual write-offs of uncollectible accounts.

(c) Represents net change in allowances for sales returns, recorded as contra-revenue.

**Item 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE**

Not applicable.

**Item 9A. CONTROLS AND PROCEDURES**

(a) *Evaluation of Disclosure Controls and Procedures* . We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in the reports that we file or submit under the Securities Exchange Act of 1934, as amended, or the Exchange Act, is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

As of December 31, 2017, our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act). Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on such evaluation, our principal executive officer and principal financial officer have concluded, that, as of December 31, 2017, our disclosure controls and procedures were effective to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

(b) *Management's Report on Internal Control over Financial Reporting* . The Company's management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act, as a process designed by, or under the supervision of, the Company's principal executive and principal financial officers and effected by the Company's board of directors, management and other personnel to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The Company's internal control over financial reporting includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

The Company's management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2016. In making this assessment, management used the criteria set forth by the

Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated Framework (2013).

Based on our assessment, management believes that, as of December 31, 2017, the Company's internal control over financial reporting is effective based on those criteria.

(c) *Changes in Internal Controls* . There were no changes in our internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15(d)-15(f) promulgated under the Exchange Act, identified in connection with the evaluation of such internal control that occurred during the fourth quarter of the last fiscal year that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

**Item 9B. OTHER INFORMATION**

Not applicable.

### PART III

**Item 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE**

The response to this item is incorporated by reference from the discussion responsive thereto under the captions “Management and Corporate Governance,” “Section 16(a) Beneficial Ownership Reporting Compliance,” and “Code of Business Conduct and Ethics” in the Company’s Proxy Statement for the 2018 Annual Meeting of Stockholders.

**Item 11. EXECUTIVE COMPENSATION**

The response to this item is incorporated by reference from the discussion responsive thereto under the caption “Executive Officer and Director Compensation” in the Company’s Proxy Statement for the 2018 Annual Meeting of Stockholders.

**Item 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS**

The response to this item is incorporated by reference from the discussion responsive thereto under the captions “Security Ownership of Certain Beneficial Owners and Management,” and “Equity Compensation Plan Information” in the Company’s Proxy Statement for the 2018 Annual Meeting of Stockholders.

**Item 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE**

The response to this item is incorporated by reference from the discussion responsive thereto under the captions “Certain Relationships and Related Person Transactions” and “Management and Corporate Governance” in the Company’s Proxy Statement for the 2018 Annual Meeting of Stockholders.

**Item 14. PRINCIPAL ACCOUNTING FEES AND SERVICES**

The response to this item is incorporated by reference from the discussion responsive thereto under the caption “Independent Registered Public Accounting Firm” in the Company’s Proxy Statement for the 2018 Annual Meeting of Stockholders.

**PART IV**

**Item 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES**

**Item 15(a).** The following documents are filed as part of this Annual Report on Form 10-K:

**Item 15(a)(1)** The following consolidated financial statements of the Company are included in Part II, Item 8 of this Annual Report on Form 10-K:

Report of Independent Registered Public Accounting Firm  
 Consolidated Balance Sheets as of December 31, 2017 and 2016  
 Consolidated Statements of Operations for the Years Ended December 31, 2017, 2016, and 2015  
 Consolidated Statements of Stockholders' Equity for the Years Ended December 31, 2017, 2016 and 2015  
 Consolidated Statements of Cash Flows for the Years Ended December 31, 2017, 2016 and 2015  
 Notes to Consolidated Financial Statements

**Item 15(a)(2)** The following financial statements schedule is included in Part II, Item 8:

Schedule II – Valuation and Qualifying Accounts

All other financial statement schedules have not been included because they are not applicable or the information is included in the financial statements or notes thereto.

**Item 15(a)(3) Exhibits**

The following is a list of exhibits filed as part of this Annual Report on Form 10-K.

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
3.1	<a href="#">Restated Certificate of Incorporation of the Registrant, as filed with the Secretary of State of the State of Delaware on June 18, 2014.</a>		Form 8-K (Exhibit 3.2)	6/19/14	001-36481
3.2	<a href="#">Restated Bylaws of Aspen Aerogels, Inc.</a>		Form 8-K (Exhibit 3.3)	6/19/14	001-36481
4.1	<a href="#">Form of common stock certificate.</a>		Amendment No. 1 to Form S-1 (Exhibit 4.1)	5/14/14	333-195523
4.2	<a href="#">Form of warrant to purchase common stock issued by the Registrant in connection with 2004 and 2005 financing arrangements, as amended and restated.</a>		Form S-1 (Exhibit 4.2)	4/28/14	333-195523
4.3	<a href="#">Form of warrant to purchase common stock issued by the Registrant in connection with the 2005 equity financing, as amended and restated.</a>		Form S-1 (Exhibit 4.3)	4/28/14	333-195523
4.4	<a href="#">Form of warrant to purchase common stock issued by the Registrant in connection with the 2008 reorganization.</a>		Form S-1 (Exhibit 4.4)	4/28/14	333-195523
4.5	<a href="#">Form of warrant to purchase common stock issued by the Registrant in connection with the 2008 financing.</a>		Form S-1 (Exhibit 4.5)	4/28/14	333-195523
4.6	<a href="#">Form of warrant to purchase common stock issued by the Registrant in connection with the 2010 subordinated note and warrant financing.</a>		Form S-1 (Exhibit 4.6)	4/28/14	333-195523

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
4.7	<a href="#">Sixth amended and restated registration rights agreement, dated as of June 11, 2012, by and among the Registrant and the investors named therein, as amended.</a>		Form S-1 (Exhibit 4.8)	4/28/14	333-195523
9.1	<a href="#">Letter agreement, dated as of June 11, 2014, by and between the Registrant and the Fidelity Funds.</a>		Amendment No. 5 to Form S-1 (Exhibit 9.1)	6/12/14	333-195523
10.1	<a href="#">2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.1)	4/28/14	333-195523
10.2	<a href="#">Form of incentive stock option agreement granted under 2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.2)	4/28/14	333-195523
10.3	<a href="#">Form of 2013 incentive stock option agreement for options issued in exchange for the forfeiture of options granted under 2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.3)	4/28/14	333-195523
10.4	<a href="#">Form of 2013 performance-based incentive stock option agreement granted under 2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.4)	4/28/14	333-195523
10.5	<a href="#">Form of non-qualified stock option agreement granted under 2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.5)	4/28/14	333-195523
10.6	<a href="#">Form of 2013 non-qualified stock option agreement for options issued in exchange for the forfeiture of options granted under 2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.6)	4/28/14	333-195523
10.7	<a href="#">Form of 2013 performance-based non-qualified stock option agreement granted under 2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.7)	4/28/14	333-195523
10.8	<a href="#">Form of 2013 independent director stock option agreement for options issued in exchange for the forfeiture of options granted under 2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.8)	4/28/14	333-195523
10.9	<a href="#">Form of 2013 performance-based independent director stock option agreement granted under 2001 equity incentive plan, as amended.</a> +		Form S-1 (Exhibit 10.1.9)	4/28/14	333-195523
10.10	<a href="#">2014 employee, director and consultant equity incentive plan.</a> +		Form S-8 (Exhibit 99.10)	8/13/14	333-198124
10.11	<a href="#">Form of stock option agreement granted under 2014 employee, director and consultant equity incentive plan.</a> +		Amendment No. 1 to Form S-1 (Exhibit 10.2.2)	5/14/14	333-195523
10.12	<a href="#">Form of restricted stock unit agreement for executive officers under 2014 employee, director and consultant equity incentive plan.</a> +		Form 10-Q (Exhibit 10.3)	11/7/14	001-36481
10.13	<a href="#">Form of restricted stock agreement for directors under 2014 employee, director and consultant equity incentive plan.</a> +		Amendment No. 1 to Form S-1 (Exhibit 10.2.3)	5/14/14	333-195523
10.14	<a href="#">Multi-tenant industrial net lease, dated August 20, 2001, by and between the Registrant and Cabot II — MA1M03, LLC (as successor landlord to TMT290 Industrial Park, Inc.), as amended.</a>		Form S-1 (Exhibit 10.3)	4/28/14	333-195523



Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
10.15.1	<a href="#">Amended and Restated Loan and Security Agreement dated September 3, 2014 and effective as of August 31, 2014, by and between the Company and Silicon Valley Bank.</a>		Form 8-K (Exhibit 10.1)	9/9/14	001-36481
10.15.2	<a href="#">Consent and First Amendment to the Amended and Restated Loan and Security Agreement, dated August 19, 2016, by and between the Registrant and Silicon Valley Bank.</a>		Form 10-Q (Exhibit 10.1)	11/3/16	001-36481
10.15.3	<a href="#">Second Amendment to the Amended and Restated Loan and Security Agreement, dated November 23, 2016, by and between the registrant and Silicon Valley Bank.</a>		Form 10-K (Exhibit 10.15.3)	3/2/17	001-36481
10.15.4	<a href="#">Third Amendment to the Amended and Restated Loan and Security Agreement, dated December 27, 2016, by and between the Registrant and Silicon Valley Bank.</a>		Form 10-K (Exhibit 10.15.4)	3/2/17	001-36481
10.15.5	<a href="#">Fourth Amendment to the Amended and Restated Loan and Security Agreement, dated January 27, 2017, by and between the Registrant and Silicon Valley Bank.</a>		Form 10-Q (Exhibit 10.1)	5/5/17	001-36481
10.15.6	<a href="#">Fifth Amendment to the Amended and Restated Loan and Security Agreement, dated September 27, 2017, by and between the Registrant and Silicon Valley Bank.</a>		Form 10-Q (Exhibit 10.1)	11/3/17	001-36481
10.16	<a href="#">Executive agreement, dated as of December 16, 2015, by and between the Registrant and Donald R. Young.</a> +		Form 10-K (Exhibit 10.16)	3/4/16	001-36481
10.17	<a href="#">Executive agreement, dated as of December 16, 2015, by and between the Registrant and John F. Fairbanks.</a> +		Form 10-K (Exhibit 10.17)	3/4/16	001-36481
10.18	<a href="#">Executive agreement, dated as of December 16, 2015, by and between the Registrant and George L. Gould, Ph.D.</a> +		Form 10-K (Exhibit 10.18)	3/4/16	001-36481
10.19	<a href="#">Executive agreement, dated as of December 16, 2015, by and between the Registrant and Jeffrey A. Ball.</a> +		Form 10-K (Exhibit 10.19)	3/4/16	001-36481
10.20	<a href="#">Executive agreement, dated as of December 16, 2015, by and between the Registrant and Corby C. Whitaker.</a> +		Form 10-K (Exhibit 10.20)	3/4/16	001-36481
10.21	<a href="#">Executive agreement, dated as of December 16, 2015, by and between the Registrant and Kelley W. Conte.</a> +		Form 10-K (Exhibit 10.21)	3/4/16	001-36481
10.22	<a href="#">Bonus plan.</a> +		Amendment No. 2 to Form S-1 (Exhibit 10.15)	5/22/14	333-195523
10.23	<a href="#">Form of participation letter of executive officers under bonus plan.</a> +		Form 10-K (Exhibit 10.23)	3/2/17	001-36481
10.24	<a href="#">Non-Employee Director Compensation Policy.</a> +		Form 10-Q (Exhibit 10.5)	8/5/16	001-36481
10.25	<a href="#">Cross license agreement dated as of April 1, 2006 by and between Cabot Corporation and the Registrant, as amended.</a> *		Form S-1 (Exhibit 10.17)	4/28/14	333-195523

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
10.2.6	<a href="#">Form of indemnification agreement with directors and certain officers.</a> +		Amendment No. 1 to Form S-1 (Exhibit 10.18)	5/14/14	333-195523
10.27	<a href="#">Inducement Agreement, dated February 15, 2016, by and between the Registrant and the Development Authority of Bulloch County, the City of Statesboro, Georgia and Bulloch County, Georgia.</a>		Form 10-Q (Exhibit 10.1)	5/6/16	001-36481
10.28	<a href="#">PILOT Agreement, dated February 15, 2016, by and between the Registrant and the Development Authority of Bulloch County, the City of Statesboro, Georgia and Bulloch County, Georgia.</a>		Form 10-Q (Exhibit 10.2)	5/6/16	001-36481
10.29	<a href="#">Performance and Accountability Agreement, dated February 15, 2016, by and between the Registrant and the Development Authority of Bulloch County, the Georgia Department of Community Affairs and the administering agency for the OneGeorgia Authority.</a>		Form 10-Q (Exhibit 10.3)	5/6/16	001-36481
10.30	<a href="#">Supply Agreement, dated June 21, 2016, by and between the Registrant and BASF SE.</a> *		Form 10-Q (Exhibit 10.1)	8/5/16	001-36481
10.31	<a href="#">Side Agreement, dated June 21, 2016, by and between the Registrant and BASF SE.</a> *		Form 10-Q (Exhibit 10.2)	8/5/16	001-36481
10.32	<a href="#">Joint Development Agreement, dated June 21, 2016, by and between the Registrant and BASF SE.</a> *		Form 10-Q (Exhibit 10.3)	8/5/16	001-36481
14.1	<a href="#">Code of business conduct and ethics.</a>		Form 8-K (Exhibit 14.1)	6/22/15	001-36481
21.1	<a href="#">Subsidiaries of the Registrant.</a>	X			
23.1	<a href="#">Consent of KPMG LLP.</a>	X			
31.1	<a href="#">Certification of principal executive officer under Section 302(a) of the Sarbanes-Oxley Act of 2002.</a>	X			
31.2	<a href="#">Certification of principal financial officer under Section 302(a) of the Sarbanes-Oxley Act of 2002.</a>	X			
32	<a href="#">Certifications of the principal executive officer and the principal financial officer under Section 906 of the Sarbanes-Oxley Act of 2002.</a>	X			

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
101	The following materials from the Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 2017, formatted in XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets as of December 31, 2017 and 2016, (ii) Consolidated Statements of Operations for the Years Ended December 31, 2017, 2016 and 2015, (iii) Consolidated Statements Stockholders' Equity for the Years Ended December 31, 2017, 2016 and 2015, (iv) Consolidated Statements of Cash Flows for the Years Ended December 31, 2017, 2016, and 2015, and (v) Notes to Consolidated Financial Statements.	X			

+ Management contract or compensatory plan or arrangement.

\* Confidential treatment has been granted with respect to certain portions of this Exhibit, which portions have been omitted and filed separately with the Securities and Exchange Commission as part of an application for confidential treatment pursuant to the Securities Act of 1933, as amended.

**Item 16 . FORM 10-K SUMMARY**

None.

## SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ASPEN AEROGELS, INC.

Date: March 1, 2018

By: /s/ Donald R. Young  
Donald R. Young  
President and Chief Executive Officer  
(principal executive officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities indicated below and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Donald R. Young</u> Donald R. Young	President, Chief Executive Officer and Director (principal executive officer)	March 1, 2018
<u>/s/ John F. Fairbanks</u> John F. Fairbanks	Vice President, Chief Financial Officer and Treasurer (principal financial officer and principal accounting officer)	March 1, 2018
<u>/s/ Mark L. Noetzel</u> Mark L. Noetzel	Chairman of the Board	March 1, 2018
<u>/s/ Rebecca A. Blalock</u> Rebecca A. Blalock	Director	March 1, 2018
<u>/s/ Robert M. Gervis</u> Robert M. Gervis	Director	March 1, 2018
<u>/s/ Steven R. Mitchell</u> Steven R. Mitchell	Director	March 1, 2018
<u>/s/ William P. Noglows</u> William P. Noglows	Director	March 1, 2018
<u>/s/ Richard F. Reilly</u> Richard F. Reilly	Director	March 1, 2018

**SUBSIDIARIES OF ASPEN AEROGELS, INC.**

Aspen Aerogels Germany GmbH, a German entity

Aspen Aerogels Rhode Island, LLC, a Rhode Island limited liability company

Aspen Aerogels Georgia, LLC, a Georgia limited liability company

**Consent of Independent Registered Public Accounting Firm**

The Board of Directors  
Aspen Aerogels, Inc.:

We consent to the incorporation by reference in the registration statements (Nos. 333-216434, 333-209995 and 333-198124) on Form S-8 and registration statement (No. 333-221403) on Form S-3 of Aspen Aerogels, Inc. of our report dated March 1, 2018, with respect to the consolidated balance sheets of Aspen Aerogels, Inc. as of December 31, 2017 and 2016, and the related consolidated statements of income, stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2017, and the related notes and financial statement schedule (collectively, the "consolidated financial statements"), which report appears in the December 31, 2017 annual report on Form 10-K of Aspen Aerogels, Inc.

/s/ KPMG LLP

Boston, Massachusetts  
March 1, 2018

## CERTIFICATIONS UNDER SECTION 302

I, Donald R. Young, certify that:

1. I have reviewed this annual report on Form 10-K of Aspen Aerogels, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2018

/s/ Donald R. Young

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Donald R. Young  
President and Chief Executive Officer  
(principal executive officer)

## CERTIFICATIONS UNDER SECTION 302

I, John F. Fairbanks, certify that:

1. I have reviewed this annual report on Form 10-K of Aspen Aerogels, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2018

/s/ John F. Fairbanks

John F. Fairbanks

Vice President, Chief Financial Officer and Treasurer

(principal financial officer and principal accounting officer)



**CERTIFICATIONS UNDER SECTION 906**

Pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of title 18, United States Code), each of the undersigned officers of Aspen Aerogels, Inc., a Delaware corporation (the "Company"), does hereby certify, to such officer's knowledge, that:

The Annual Report for the year ended December 31, 2017 (the "Form 10-K") of the Company fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and the information contained in the Form 10-K fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: March 1, 2018

/s/ Donald R. Young

Donald R. Young  
President and Chief Executive Officer  
(principal executive officer)

Dated: March 1, 2018

/s/ John F. Fairbanks

John F. Fairbanks  
Vice President, Chief Financial Officer and Treasurer  
(principal financial officer and principal accounting officer)