UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended March 31, 2019

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	**04-3559972**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
30 Forbes Road, Building B Northborough, Massachusetts	**01532**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (508) 691-1111

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 every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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

Large accelerated filer	☐	Accelerated filer	☒
Non-accelerated filer	☐	Smaller reporting company	☒
		Emerging growth company	☒

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. ☒

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

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol	Name of exchange on which registered
Common Stock	ASPN	The New York Stock Exchange

As of May 1, 2019, the registrant had 24,246,807 shares of common stock outstanding

ASPEN AEROGELS, INC.

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Trademarks, Trade Names and Service Marks

We own or have rights to use "Aspen Aerogels," "Cryogel," "Pyrogel," "Spaceloft," the Aspen Aerogels logo and other trademarks, service marks and trade names of Aspen Aerogels, Inc. appearing in this Quarterly Report on Form 10-Q. Solely for convenience, the trademarks, service marks and trade names referred to in this report are presented without the ® and TM symbols, but such references are not intended to indicate, in any way, that the owner thereof will not assert, to the fullest extent under applicable law, such owner's rights to these trademarks, service marks and trade names. This report contains additional trademarks, service marks and trade names of other companies, which, to our knowledge, are the property of their respective owners.

PART I — FINANC IAL INFORMATION

Item 1. Financial Statements.

ASPEN AEROGELS, INC.

Consolidated Balance Sheets

(Unaudited)

	March 31, 2019	December 31, 2018
	(In thousands, except share and per share data)	
Assets		
Current assets:		
Cash and cash equivalents	$ 3,369	$ 3,327
Accounts receivable, net of allowances of $2,880 and $2,877	22,287	25,565
Inventories	9,268	7,318
Prepaid expenses and other current assets	916	1,041
Total current assets	35,840	37,251
Property, plant and equipment, net	59,648	61,699
Operating lease right-of-use assets	4,562	—
Other long-term assets	71	73
Total assets	$ 100,121	$ 99,023
Liabilities and Stockholders’ Equity		
Current liabilities:		
Accounts payable	$ 8,571	$ 12,392
Accrued expenses	4,230	3,864
Revolving line of credit	3,325	4,181
Deferred revenue	3,579	2,629
Operating lease liabilities	976	—
Total current liabilities	20,681	23,066
Deferred rent	—	1,218
Prepayment liability	9,838	4,485
Operating lease liabilities long-term	4,926	—
Total liabilities	35,445	28,769
Commitments and contingencies (Note 7)		
Stockholders’ equity:		
Preferred stock, $0.00001 par value; 5,000,000 shares authorized, no shares issued and outstanding at March 31, 2019 and December 31, 2018	—	—
Common stock, $0.00001 par value; 125,000,000 shares authorized, 24,246,807 and 23,973,517 shares issued and outstanding at March 31, 2019 and December 31, 2018, respectively	—	—
Additional paid-in capital	542,263	541,839
Accumulated deficit	(477,587)	(471,585)
Total stockholders’ equity	64,676	70,254
Total liabilities and stockholders’ equity	$ 100,121	$ 99,023

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.

Consolidated Statements of Operations

(Unaudited)

	Three Months Ended March 31, 2019	Three Months Ended March 31, 2018
	(In thousands, except share and per share data)	
Revenue:		
Product	$ 26,785	$ 22,521
Research services	1,127	553
Total revenue	27,912	23,074
Cost of revenue:		
Product	23,478	20,023
Research services	716	241
Gross profit	3,718	2,810
Operating expenses:		
Research and development	1,928	1,605
Sales and marketing	3,511	3,499
General and administrative	4,240	4,456
Total operating expenses	9,679	9,560
Loss from operations	(5,961)	(6,750)
Interest expense, net	(41)	(92)
Total interest expense, net	(41)	(92)
Net loss	$ (6,002)	$ (6,842)
Net loss per share:		
Basic and diluted	$ (0.25)	$ (0.29)
Weighted-average common shares outstanding:		
Basic and diluted	23,930,613	23,567,019

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.

Consolidated Statements of Stockholders' Equity

(Unaudited)
(In thousands, except 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			
Balance at December 31, 2018	—	$ —	23,973,517	$ —	$ 541,839	$ (471,585)	$ 70,254
Net loss	—	—	—	—	—	(6,002)	(6,002)
Stock compensation expense	—	—	—	—	878	—	878
Vesting of restricted stock units	—	—	273,290	—	(454)	—	(454)
Balance at March 31, 2019	—	$ —	24,246,807	$ —	$ 542,263	$ (477,587)	$ 64,676

	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			
Balance at December 31, 2017	—	$ —	23,643,189	$ —	$ 538,088	$ (437,145)	$ 100,943
Net loss	—	—	—	—	—	(6,842)	(6,842)
Stock compensation expense	—	—	—	—	1,136	—	1,136
Vesting of restricted stock units	—	—	239,064	—	(504)	—	(504)
Balance at March 31, 2018	—	$ —	23,882,253	$ —	$ 538,720	$ (443,987)	$ 94,733

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.

Consolidated Statements of Cash Flows

(Unaudited)

	Three Months Ended March 31, 2019	Three Months Ended March 31, 2018
	(In thousands)	
Cash flows from operating activities:		
Net loss	$ (6,002)	$ (6,842)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	2,532	3,171
Stock-compensation expense	878	1,136
Operating lease right-of-use assets	217	—
Lease incentives	—	(30)
Changes in operating assets and liabilities:		
Accounts receivable	3,278	6,630
Inventories	(1,950)	(1,059)
Prepaid expenses and other assets	127	204
Accounts payable	(3,709)	(3,340)
Accrued expenses	517	(1,923)
Deferred revenue	1,403	(335)
Operating lease liabilities	(246)	—
Other liabilities	(56)	(10)
Net cash used in operating activities	(3,011)	(2,398)
Cash flows from investing activities:		
Capital expenditures	(637)	(677)
Net cash used in investing activities	(637)	(677)
Cash flows from financing activities:		
Proceeds from borrowings under line of credit	36,914	—
Repayment of borrowings under line of credit	(37,770)	—
Prepayment proceeds under customer supply agreement, net	5,000	2,500
Payments made for employee restricted stock tax withholdings	(454)	(504)
Net cash provided by financing activities	3,690	1,996
Net increase (decrease) in cash	42	(1,079)
Cash and cash equivalents at beginning of period	3,327	10,694
Cash and cash equivalents at end of period	$ 3,369	$ 9,615
Supplemental disclosures of cash flow information:		
Interest paid	$ 96	$ 99
Income taxes paid	$ —	$ —
Supplemental disclosures of non-cash activities:		
Initial recognition of operating lease liabilities related to right-of-use assets	$ 5,995	$ —
Right-of-use assets obtained in exchange for new operating lease liabilities	$ 153	$ —
Changes in accrued capital expenditures	$ (112)	$ (281)

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

(UNAUDITED)

(1) Description of Business and Basis of Presentation

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.

Liquidity

During the three months ended March 31, 2019, the Company incurred a net loss of $6.0 million, used $3.0 million of cash in operations and had a cash and cash equivalents balance of $3.4 million and outstanding borrowing under its revolving line of credit of $3.3 million (see note 7). After giving effect to outstanding borrowings and letters of credit, the additional amount available to the Company at March 31, 2019 under the revolving line of credit was $7.1 million. The existing revolving line of credit matures on April 28, 2020.

The Company is making investments to increase capacity at its existing manufacturing facility in East Providence, Rhode Island and to develop new technologies and business opportunities. The Company expects its existing cash balance and the amount anticipated to be available under the existing revolving line of credit will be sufficient to fund a portion of these investments. The Company plans to manage other capital expenditures and working capital balances to maintain the cash resources required to support current operating requirements and to complete the capacity expansion plan.

The Company will need to supplement its cash balance and amounts available under its revolving line of credit with anticipated cash flows from operations, debt financings, customer prepayments, technology licensing agreements or equity financings to provide the capital required to complete the expansion of the existing manufacturing facility and to fund its strategic business initiatives.

Unaudited Interim Financial Information

The accompanying unaudited interim consolidated financial statements include the accounts of the Company and have been prepared in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP) and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Certain information and disclosures normally included in the consolidated financial statements prepared in accordance with U.S. GAAP have been condensed or omitted pursuant to such rules and regulations. As such, the information included in this Quarterly Report on Form 10-Q should be read in conjunction with the audited consolidated financial statements and accompanying notes in our Annual Report on Form 10-K for the year ended December 31, 2018 (the Annual Report), filed with the Securities and Exchange Commission on March 8, 2019.

In the opinion of the Company’s management, the unaudited interim consolidated financial statements have been prepared on the same basis as the audited consolidated financial statements and include all adjustments that are of a normal recurring nature and necessary for the fair statement of the Company’s financial position as of March 31, 2019 and the results of its operations and stockholders’ equity for the three months ended March 31, 2019 and 2018 and the cash flows for the three month periods then ended. The Company has evaluated events through the date of this filing.

The results of operations for the three months ended March 31, 2019 are not necessarily indicative of the results to be expected for the year ending December 31, 2019 or any other period.

(2) Significant Accounting Policies

Principles of Consolidation

The accompanying consolidated financial statements, which have been prepared in accordance with 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.

Revenue Recognition

On January 1, 2018, the Company adopted Accounting Standards Codification 606, Revenue from Contracts with Customers (ASC 606). See note 3 for further details.

Leases

On January 1, 2019, the Company adopted Accounting Standards Update (ASU) 2016-02, Leases (Topic 842) . See note 8 for further details.

Stock-based Compensation

Stock-based compensation expense is measured at the grant date based on the fair value of the award. 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, which requires 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 restricted stock unit grants is determined using the closing trading price of the Company’s common stock on the date of grant. The fair value of awards containing market conditions is determined using a Monte Carlo simulation model based upon the nature of the conditions, the expected volatility of the underlying security, and other relevant factors.

During the three months ended March 31, 2019, the Company granted 644,617 restricted common stock units (RSUs) with a grant date fair value of $2.3 million and 632,183 non-qualified stock options (NSOs) to purchase shares of common stock with a grant date fair value of $1.1 million to employees under the 2014 Employee, Director and Consultant Equity Incentive Plan (the 2014 Equity Plan). The RSUs and NSOs granted to employees will vest over a three year period.

Stock-based compensation is included in cost of revenue or operating expenses, as applicable, and consists of the follow ing:

	Three Months Ended March 31,	
	2019	2018
	(In thousands)	
Cost of product revenue	$ 117	$ 154
Research and development expenses	114	111
Sales and marketing expenses	129	232
General and administrative expenses	518	639
Total stock-based compensation	$ 878	$ 1,136

Pursuant to the "evergreen" provisions of the 2014 Equity Plan, the number of shares of common stock authorized for issuance under the plan automatically increased by 479,470 shares to 7,488,930 shares effective January 1, 2019.

As of March 31, 2019, 4,638,401 shares of common stock were reserved for issuance upon the exercise or vesting of outstanding stock-based awards granted under the 2014 Equity Plan. In addition, as of March 31, 2019, 89,462 shares of common stock were reserved for issuance upon the exercise of outstanding stock 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 of such options becoming available for grant under the 2014 Equity Plan. As of March 31, 2019, there were 1,033,344 shares of common stock available for future grant under the 2014 Equity Plan.

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 loss gives effect to all potentially dilutive common equivalent shares, including outstanding stock options, and RSUs. Common equivalent shares are excluded from the computation of diluted net loss per share if their effect is antidilutive.

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:

	Three Months Ended March 31,	
	2019	2018
	(In thousands)	
Revenue:		
U.S.	$ 11,252	$ 9,882
International	16,660	13,192
Total	$ 27,912	$ 23,074

Warranty

The Company provides warranties for its products and records the estimated cost within cost of revenue 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 deman ds 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.

The Company performs periodic testing of its aerogel blankets to ensure compliance with published performance specifications. From time to time, tests may indicate a product could potentially perform outside of these specifications. At that time, additional testing is initiated or the Company may conduct a root cause investigation. During the year ended December 31, 2018, test results indicated that tested samples performed outside the published performance specifications for a specific attribute of a product. The Company has determined that it is probable it has incurred a liability, however, a liability or range of liability is not estimable as of March 31, 2019. The Company will continue to assess the impact of the testing results on its customer base and, depending on the assessment, could be subject to warranty charges in future periods.

The Company did not record any warranty expense during the three months ended March 31, 2019 and 2018. As of March 31, 2019, the Company had satisfied all outstanding warranty claims.

Recently Issued Accounting Standards

From time to time, new accounting pronouncements are issued by the Financial Accounting Standards Board (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 Since December 31, 2018

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 standard is effective for fiscal years beginning after December 15, 2018. The Company adopted this standard on January 1, 2019 using the modified retrospective transition approach with the effective date as the date of initial application. As a result, the Company will not update financial information or provide the disclosures required under the new standard for dates and periods before January 1, 2019. To measure its lease liabilities, the Company uses its incremental borrowing rate as of the date of adoption or the rate implicit in the lease, if available. The discount rate is applied to the remaining lease term and remaining payments at the date of adoption. The Company elected the package of practical expedients under the new standard, which permits the Company to not reassess prior conclusions about lease identification, lease classification, and initial direct costs. The most significant effects of this new standard on the consolidated financial statements relate to the recognition of new right-of-use (ROU) assets and lease liabilities on the consolidated balance sheets and the provision of significant new disclosures about leasing activities. Upon adoption on January 1, 2019, the Company recognized operating lease liabilities of approximately $6.0 million with corresponding ROU assets of approximately $4.6 million. Additionally, the Company derecognized deferred rent liabilities of $1.4 million. This standard has not materially impacted the Company's consolidated net loss or net cash used in operations. The Company elected the short-term lease recognition exemption for all leases that qualify. For leases that qualify for this exemption, the Company does not recognize ROU assets or lease liabilities. The Company also elected the practical expedient to not separate non-lease components from the associated lease components for all of its equipment leases.

Standards to be Implemented

The Company believes that the impact of recently issued accounting standards that are not yet effective will not have a material impact on its consolidated financial statements.

(3) Revenue from Contracts with Customers

On January 1, 2018, the Company Adopted Accounting Standards Codification 606, Revenue from Contracts with Customers (ASC 606) using the modified retrospective method for all contracts not completed as of the date of adoption. The adoption of ASC 606 did not have a material impact on the allocation and timing of the recognition of previously reported revenues from the sale of products, subsea projects or the performance of research services. In addition, the Company determined that there are no incremental contract costs or contract fulfillment costs associated with the adoption of ASC 606. The adoption of ASC 606 represents a change in accounting principle that more closely aligns revenue recognition with the delivery of the Company's product or performance of research services and will provide financial statement readers with enhanced disclosures.

Revenue Recognition

Revenue is recognized when a customer obtains control of promised goods or services in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements within the scope of ASC 606, the Company performs the following five steps: (i) identification of the contract with a customer; (ii) identification of the performance obligations in the contract; (iii) determination of the transaction price; (iv) allocation of the transaction price to the separate performance obligations in the contract; and (v) recognition of the revenue associated with performance obligations as they are satisfied. The Company applies the five-step model to contracts when it is probable that the Company will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, the Company assesses the goods or services promised within each contract and determines those that are performance obligations, and assesses whether each promised good or service is distinct. If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price based on the estimated relative standalone selling prices of the promised products or services underlying each performance obligation. The Company determines standalone selling prices based on the price at which the performance obligation is sold separately. If the standalone selling price is not observable through past transactions, the Company estimates the standalone selling price taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

When determining the transaction price of a contract, an adjustment is made if payment from a customer occurs either significantly before or significantly after performance, resulting in a significant financing component. Applying the practical expedient in paragraph ASC 606-10-32-18, the Company does not assess whether a significant financing component exists if the period between when the Company performs its obligations under the contract and when the customer pays is one year or less. The Company did not have any contracts outstanding at December 31, 2018 and did not enter into any contracts during the three months ended March 31, 2019 that contained a significant financing component.

The Company records deferred revenue for product sales when the Company has delivered products but other performance obligations have not been satisfied or control has not been transferred to the customer.

Shipping and Handling Costs

Shipping and handling costs associated with outbound freight after control over a product has transferred to a customer are accounted for as fulfillment costs and are included in the cost of product revenue. The amount of revenue recognized reflects the consideration to which the Company expects to be entitled to receive in exchange for these products or research services.

Product Revenue

The Company generally enters into contracts containing one type of performance obligation. The Company recognizes product revenue when the performance obligation is satisfied, which is generally upon delivery according to contractual shipping terms within customer purchase orders.

The Company also enters into rebate agreements with certain customers. These agreements may be considered an additional performance obligation of the Company or variable consideration within a contract. Rebates are recorded as a reduction of revenue in the period the related product revenue is recognized. A corresponding liability is recorded as a component of deferred revenue on the consolidated balance sheets. These arrangements are primarily based on the customer attaining contractually specified sales volumes.

The Company estimates the amount of its product sales that may be returned by its customers and records this estimate as a reduction of revenue in the period the related product revenue is recognized. The Company currently estimates product return liabilities using historical rates of return, current quarter credit sales, and specific items of exposure on a contract by contract basis. Sales return reserves were approximately $0.1 million at both March 31, 2019 and December 31, 2018.

Subsea Projects

The Company manufactures and sells subsea products that are designed for pipe-in-pipe applications in offshore oil production and are typically customized to meet customer specifications. Subsea products typically have no alternative use and contain an enforceable right to payment. Customer invoicing terms for subsea products are typically based on certain milestones within the production and delivery schedule. Under the provisions of ASC 606, the Company recognizes revenue at a point in time when transfer of control of the products is passed to the customer, or over time utilizing the input/cost-to-cost method. The timing of revenue recognition is assessed on a contract by contract basis. During the three months ended March 31, 2019 and 2018 , the Company recognized $4.7 million and $0.8 million, respectively, in connection with subsea projects.

Research Services

The Company performs research services under contracts with various government agencies and other institutions. These contracts generally have one type of performance obligation associated with the provision of research services including functional licenses to any resulting intellectual property. The Company records revenue 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 contacts is the labor effort expended in completing the research, and the only deliverable, other than the labor hours expended, is the 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 within the period they become known. To date, adjustments to revenue as a result of contracting agency audits have been insignificant .

Disaggregation of Revenue

In the following table, revenue is disaggregated by primary geographical region and source of revenue:

	Three Months Ended March 31,					
	2019			2018		
	U.S.	International	Total	U.S.	International	Total
	(In thousands)					
Geographical region						
Asia	$ —	$ 6,723	$ 6,723	$ —	$ 8,228	$ 8,228
Canada	—	1,897	1,897	—	1,675	1,675
Europe	—	7,123	7,123	—	2,455	2,455
Latin America	—	917	917	—	834	834
U.S.	11,252	—	11,252	9,882	—	9,882
Total revenue	$ 11,252	$ 16,660	$ 27,912	$ 9,882	$ 13,192	$ 23,074
Source of revenue						
Product revenue	$ 10,125	$ 11,965	$ 22,090	$ 9,324	$ 12,353	$ 21,677
Subsea projects	—	4,695	4,695	5	839	844
Research services	1,127	—	1,127	553	—	553
Total revenue	$ 11,252	$ 16,660	$ 27,912	$ 9,882	$ 13,192	$ 23,074

Contract Balances

The following table presents changes in the Company's contract assets and contract liabilities during the three months ended March 31, 2019:

	Balance at December 31, 2018	Additions	Deductions	Balance at March 31, 2019
		(In thousands)		
Contract assets				
Subsea projects	$ 2,742	$ 8,608	$ (7,232)	$ 4,118
Research services	369	1,031	(412)	988
Total contract assets	$ 3,111	$ 9,639	$ (7,644)	$ 5,106
Contract liabilities				
Deferred revenue				
Product revenue	$ 1,751	$ 266	$ (686)	$ 1,331
Subsea projects	781	4,567	(3,295)	2,053
Research services	97	143	(45)	195
Prepayment liability	4,485	5,353	—	9,838
Total contract liabilities	$ 7,114	$ 10,329	$ (4,026)	$ 13,417

During the three months ended March 31, 2019, the Company recognized $1.0 million of revenue that was included in deferred revenue at the beginning of the period.

A contract asset is recorded when the Company satisfies a performance obligation by transferring a promised good or service and has earned the right to consideration from its customer. These assets may represent a conditional or unconditional right to consideration and are included within accounts receivable on the consolidated balance sheets.

A contract liability is recorded when consideration is received, or such consideration is unconditionally due, from a customer prior to transferring goods or services under the terms of the contract. Contract liabilities are recognized as revenue after control of the products or services is transferred to the customer and all revenue recognition criteria have been met.

(4) Inventories

Inventories consist of the following:

	March 31, 2019	December 31, 2018
	(In thousands)	
Raw materials	$ 3,351	$ 3,159
Finished goods	5,917	4,159
Total	$ 9,268	$ 7,318

(5) Property, Plant and Equipment, Net

Property, plant and equipment consist of the following:

	March 31, 2019	December 31, 2018	Useful life
	(In thousands)		
Construction in progress	$ 1,879	$ 1,568	—
Buildings	24,016	24,016	30 years
Machinery and equipment	120,549	120,466	3-10 years
Computer equipment and software	8,385	8,352	3 years
Total	154,829	154,402	
Accumulated depreciation	(95,181)	(92,703)	
Property, plant and equipment, net	$ 59,648	$ 61,699	

Depreciation expense was $2.5 million and $3.2 million for the three months ended March 31, 2019 and 2018, respectively.

Construction in progress included $1.2 million at both March 31, 2019 and December 31, 2018 related to projects associated with the Company's plan to expand the capacity of the East Providence, Rhode Island facility.

(6) Accrued Expenses

Accrued expenses consist of the following:

	March 31, 2019	December 31, 2018
	(In thousands)	
Employee compensation	$ 2,939	$ 2,750
Other accrued expenses	1,291	1,114
Total	$ 4,230	$ 3,864

(7) Commitments and Contingencies

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 certain of the Company's products at annual volumes to be specified by BASF, subject to certain volume limits. However, BASF has no obligation to purchase products under the Supply Agreement. The Supply Agreement will terminate on December 31, 2027 with respect to the Company's Spaceloft A2 product and December 31, 2028 with respect to a new product developed under the JDA. Upon the expiration of the Supply Agreement with respect to each product, the Company will be subject to a post-termination supply commitment for an additional two years. The JDA is designed to facilitate collaboration by 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 $22.0 million during the term of the Supply Agreement. These prepayment obligations are 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. BASF made a prepayment in the amount of $5.0 million to the Company in 2018 (the 2018 Prepayment). After January 1, 2019, BASF may require that the Company credit up to 25.3% of any amounts invoiced by the Company for the Spaceloft A2 product sold to BASF against the 2018 Prepayment balance. If any of the 2018 Prepayment remains uncredited as of December 31, 2021, BASF may require that the Company repay the uncredited amount to BASF.

Pursuant to the first addendum to the Supply Agreement, on January 30, 2019, BASF made an additional prepayment in the amount of $5.0 million to the Company (the 2019 Prepayment). After January 1, 2020, the Company will credit 50.0% of any amounts that it invoices for the newly developed product sold to BASF against the outstanding balance of the 2019 Prepayment. After December 31, 2022, BASF may require that the Company credit an additional 24.7% of any amounts invoiced by the Company for Spaceloft A2 product sold to BASF against the outstanding balance of the 2019 Prepayment, if any, or require that the Company repay the uncredited amount of the 2019 Prepayment to BASF in full.

As of March 31, 2019, the Company had received $10.0 million in prepayments from BASF and applied less than $0.1 million of credits against amounts invoiced. The prepayments are recorded on the balance sheet as a prepayment liability, net of the current portion of $0.2 million which is included within deferred revenue. The amounts and terms of additional prepayment installments, if any, are subject to negotiation between the Company and BASF.

Revolving Line of Credit

The Company is party to an Amended and Restated Loan and Security Agreement with Silicon Valley Bank (the Loan Agreement). On March 4, 2019, the Loan Agreement was amended to extend the maturity date of the revolving credit facility to April 28, 2020.

Under the revolving credit facility the Company is permitted to borrow a maximum of $20.0 million, subject to continued covenant compliance and borrowing base requirements. At the Company's 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, the Company is 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.

Under the Loan Agreement, the Company is r equired to comply with both non-financial and financial covenants, including a minimum EBITDA covenant, as defined. At March 31, 2019, the Company was in compliance with all such covenants. Obligations under the Loan Agreement are secured by a security int erest in all assets of the Company, including those at the East Providence facility, except for certain exclusions. The Company intends to extend or replace the facility prior to its maturity.

At March 31, 2019 and December 31, 2018, the Company had $3.3 million and $4.2 million, respectively, drawn on the revolving credit facility. The Company has been required to provide letters of credit to secure obligations under certain commercial contracts and other obligations. The Company had outstanding letters of credit backed by the revolving credit facility of $0.5 million and $1.6 million at March 31, 2019 and December 31, 2018, respectively, which reduce the funds otherwise available to the Company under the facility.

At March 31, 2019, the effective amount available to the Company under the revolving credit facility was $7.1 million after giving effect to the $3.3 million in outstanding borrowings and $0.5 million of outstanding letters of credit.

Litigation

The Company is, from time to time, a party to litigation that arises in the normal course of its business operations. See Part II, Item 1 “Legal Proceedings” of this Quarterly Report on Form 10-Q 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.

(8) Leases

The Company leases office and warehouse space in Northborough, Massachusetts and East Providence, Rhode Island. The Company also leases equipment under operating leases expiring at various dates through 2026. Under these agreements, the Company is obligated to pay annual rent, real estate taxes, and certain other operating expenses.

On January 1, 2019, the Company adopted ASU 2016-02 which modifies the accounting for leases and requires that all leases be recorded on the consolidated balance sheets as assets and liabilities. The Company adopted this standard using the modified retrospective transition approach with the effective date as the date of initial application. As a result, the Company will not update financial information or provide the disclosures required under the new standard for dates and periods before January 1, 2019. The Company also elected the package of practical expedients under the new standard, which permits the Company to not reassess prior conclusions about lease identification, lease classification, and initial direct costs. In addition, the Company elected the short-term lease recognition exemption under which the Company will not recognize ROU assets or lease liabilities for all leases that qualify. The Company also elected the practical expedient to not separate non-lease components from the associated lease components for all of its equipment leases.

The Company determines if an arrangement is a lease at inception. ROU assets represent the Company’s right to use an underlying asset for the lease term and lease liabilities represent the Company’s payment obligations under the lease. Operating lease ROU assets and liabilities are recognized based on the present value of lease payments over the lease term. To measure its lease liabilities, the Company uses its incremental borrowing rate or the rate implicit in the lease, if available. ROU assets also include any direct costs and prepaid lease payments but exclude any lease incentives received. The Company’s lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term.

The Company elected the short-term lease recognition exemption for all leases that qualify. For leases that qualify for this exemption, the Company will not recognize ROU assets or lease liabilities. For lease agreements with lease and non-lease components, the Company will account for each component separately. However, in the case of equipment leases, the Company will account for lease and non-lease components as a single component.

Prior to the Company’s adoption of ASU 2016-02, the Company recorded the difference between rent expense recognized on a straight-line basis and the contractual payments as deferred rent. Deferred rent consisted of the following at December 31, 2018:

		December 31, 2018
Deferred rent	$	1,368
Current maturities of deferred rent		(150)
Deferred rent, less current maturities	$	1,218

Upon adoption of ASU 2016-02 on January 1, 2019, the Company recognized operating lease liabilities of approximately $6.0 million with corresponding ROU assets of approximately $4.6 million. Additionally, the Company derecognized deferred rent liabilities of $1.4 million. Maturities of operating lease liabilities at March 31, 2019 are as follows:

Year		Operating Leases
		(In thousands)
2019 (excluding the three months ended March 31, 2019)	$	1,048
2020		1,344
2021		1,164
2022		1,111
2023		1,093
Thereafter		1,701
Total lease payments		7,461
Less imputed interest		(1,559)
Total lease liabilities	$	5,902

The Company incurred operating lease costs of $0.3 million during the three months ended March 31, 2019. Cash payments related to operating lease liabilities were $0.4 million during the three months ended March 31, 2019. At March 31, 2019, weighted average remaining lease term for operating leases was 6.1 years. At March 31, 2019, the weighted average discount rate for operating leases was 7.9%.

As of March 31, 2019, the Company has additional operating equipment leases with total lease payments of $0.1 million that have not commenced. These operating leases will commence during fiscal year 2019 and have lease terms of two to three years.

(9) Net Loss Per Share

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

	Three Months Ended March 31,			
		2019		2018
	(In thousands, except share and per share data)			
Numerator:				
Net loss	$	(6,002)	$	(6,842)
Denominator:				
Weighted average shares outstanding, basic and diluted		23,930,613		23,567,019
Net loss per share, basic and diluted	$	(0.25)	$	(0.29)

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:

	Three Months Ended March 31,	
	2019	2018
Common stock options	3,625,011	2,897,424
Restricted common stock units	1,102,852	961,997
Restricted common stock awards	136,187	151,859
Total	4,864,050	4,011,280

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.

(10) 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.

(11) Subsequent Events

The Company has evaluated subsequent events through May 2, 2019, the date of issuance of the consolidated financial statements for the three months ended March 31, 2019.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following information should be read in conjunction with the unaudited financial information and the notes thereto included in this Quarterly Report on Form 10-Q and the audited financial information and the notes thereto included in the Annual Report on Form 10-K for the year ended December 31, 2018, filed with the Securities and Exchange Commission (SEC) on March 8, 2019, which we refer to as the Annual Report.

Certain matters discussed in this Quarterly Report on Form 10-Q may be deemed to be forward-looking statements that involve risks and uncertainties. We make such forward-looking statements pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 and other federal securities laws. In this Quarterly Report on Form 10-Q, words such as "may," "will," "anticipate," "estimate," "expects," "projects," "intends," "plans," "believes" and similar expressions (as well as other words or expressions referencing future events, conditions or circumstances) are intended to identify forward-looking statements.

Our actual results and the timing of certain events may differ materially from the results discussed, projected, anticipated, or indicated in any forward-looking statements. We caution you that forward-looking statements are not guarantees of future performance and that our actual results of operations, financial condition and liquidity, and the development of the industry in which we operate may differ materially from the forward-looking statements contained in this Quarterly Report on Form 10-Q. In addition, even if our results of operations, financial condition and liquidity, and the development of the industry in which we operate are consistent with the forward-looking statements contained in this Quarterly Report on Form 10-Q, they may not be predictive of results or developments in future periods.

The following information and any forward-looking statements should be considered in light of factors discussed elsewhere in this Quarterly Report on Form 10-Q and under "Risk Factors" in Item 1A of the Annual Report.

We caution readers not to place undue reliance on any forward-looking statements made by us, which speak only as of the date they are made. We disclaim any obligation, except as specifically required by law and the rules of the SEC, to publicly update or revise any such statements to reflect any change in our expectations or in events, conditions or circumstances on which any such statements may be based, or that may affect the likelihood that actual results will differ from those set forth in the forward-looking statements.

You should read the following discussion and analysis of financial condition and results of operations together with Part I Item 1 "Financial Statements," which includes our financial statements and related notes, elsewhere in this Quarterly Report on Form 10-Q.

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, enhance sustainability, 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 50 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 rese arch 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 have operated the East Providence facility since 2008. During 2018, we initiated a series of projects designed to increase this nameplate capacity by 20 percent to approximately 60 million square feet of aerogel blankets by the end of 2020. As of March 31, 2019, we had increased our annual capacity to approximately 55 million square feet of aerogel blankets.

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 exclusive sale of specified products to BASF and a joint development agreement targeting innovative products and technologies. BASF has no obligation to purchase any products under the supply agreement. Pursuant to the supply agreement, BASF may, in its sole discretion, make prepayments to us in the aggregate amount of up to $22.0 million during the term of the agreement. The prepayments may be repaid by us to BASF at any time in whole or in part for any reason.

BASF made a prepayment to us of $5.0 million during 2018. After January 1, 2019, 25.3% of any amounts that we invoice for Spaceloft A2 sold to BASF will be credited against the outstanding balance of the 2018 prepayment. If any amount of the 2018 prepayment remains uncredited at December 31, 2021, BASF may require that we repay the uncredited amount to BASF. In January 2019, BASF made an additional prepayment to us of $5.0 million. After January 1, 2020, 50% of any amounts that we invoice for a newly developed product sold to BASF will be credited against the outstanding balance of the 2019 prepayment. After December 31, 2022, BASF may require that we credit 24.7% of any amounts we invoice for Spaceloft A2 sold to BASF against the outstanding balance of the 2019 prepayment or require that we repay the uncredited amount to BASF.

On March 4, 2019, our revolving credit facility with Silicon Valley Bank was amended to extend the maturity date of the facility to April 28, 2020. The amendment to the credit facility also (i) revised the definition of “Borrowing Base” to remove the eligible inventory component of the Borrowing Base, (ii) removed the Adjusted Quick Ratio financial covenant set forth in the loan agreement and (iii) established certain minimum EBITDA levels with respect to the minimum EBITDA financial covenant for the extended term. 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.

Our revenue for the three months ended March 31, 2019 was $27.9 million, which represented an increase of $4.8 million from the three months ended March 31, 2018. Net loss for the three months ended March 31, 2019 was $6.0 million and net loss per share was $0.25. Net loss for the three months ended March 31, 2018 was $6.8 million and net loss per share was $0.29.

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 approximately 55 million square feet of aerogel blankets at March 31, 2019. 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:

	Three Months Ended March 31,	
	2019	**2018**
	(In thousands)	
Product shipments in square feet	8,685	7,742

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, from time to time, which 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 (loss), income (loss) 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 income 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 U.S. GAAP financial statements included elsewhere in this Quarterly Report on Form 10-Q, 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 U.S. GAAP measure, to Adjusted EBITDA for the periods presented:

	Three Months Ended March 31,	
	2019	2018
	(In thousands)	
Net loss	$ (6,002)	$ (6,842)
Depreciation and amortization	2,532	3,171
Stock-based compensation (1)	878	1,136
Interest expense	41	92
Adjusted EBITDA	$ (2,551)	$ (2,443)

(1) Represents non-cash stock-based compensation related to vesting and modifications of stock option grants, vesting of restricted stock units and vesting 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 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, 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 longer term. Accordingly, we expect that our net income (loss), earnings per share and Adjusted EBITDA will vary from period to period as we expand our manufacturing capacity.

During 2019, we are projecting growth in total revenue principally due to expected volume growth in our core petrochemical and refinery markets, an anticipated increase in project-based demand, particularly in the subsea and LNG markets, and increasing penetration of new markets, including the building materials market . We have also implemented a price increase for 2019 designed to support revenue growth and to offset an increase in raw material costs. As a result of these factors, we are projecting total revenue growth versus 2018 in excess of 20%, a decrease in net loss and a return to positive Adjusted EBITDA for the year.

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 and research services revenue is recognized upon the satisfaction of contractual performance obligations.

We record deferred revenue for product sales when (i) we have delivered products but other revenue recognition criteria have not been satisfied or (ii) payments have been received in advance of products being delivered.

Cost of Revenue

Cost of product revenue consists primarily of materials and manufacturing expense. Cost of product revenue is recorded when the related product revenue is recognized.

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 vary from product to product due to differences in average selling prices, material requirements, product thicknesses and manufacturing yields. During the year ended December 31, 2018, we experienced a significant increase in the costs of certain silica precursor materials, which constitute over 50% of our raw material costs. In addition, we provide warranties for our products and record the estimated cost within cost of revenue in the period that the related revenue is recorded or when we become aware that a potential warranty claim is probable and can be reasonably estimated. During the year ended December 31, 2018, test results indicated that tested samples performed outside the published performance specifications for a specific attribute of a product. We determined that it is probable we have incurred a liability, however, the liability is not estimable as of March 31, 2019. We will continue to assess the impact of the test results on our customer base and, depending on the assessment, we could be subject to warranty charges in future periods. As a result of these factors, material costs as a percentage of revenue will vary from period to period due to changes in the mix of aerogel products sold, the costs of our raw materials or the estimated cost of warranties. In 2019, we expect material costs to decline as a percentage of revenue as we seek to achieve higher selling prices, lower cost formulations, material sourcing improvements, and manufacturing yield enhancements for our aerogel products.

Manufacturing expense is also a significant component of cost of revenue. Manufacturing expense includes labor, utilities, maintenance expense, and depreciation on manufacturing assets . Manufacturing expense also includes stock-based compensation of manufacturing employees and shipping costs. We expect manufacturing expense will grow in absolute dollars during 2019, but at a rate lower than the expected growth in product revenue. As a r esult, we expect manufacturing expense as a percentage of revenue will decrease in 2019 versus 2018.

In total, we expect that cost of product revenue will increase in absolute dollars, but decrease as a percentage of product revenue during 2019 versus 2018. The projected increase in cost of product revenue in absolute dollars reflects the impact of a planned increase in manufacturing output to support expected revenue growth, offset, in part, by a projected increase in average selling prices and an expected favorable mix of products sold. In the longer term, we expect cost of product revenue will continue both to increase in absolute dollars and to decline as a percentage of revenue.

Cost of research services revenue consists of direct labor costs of research personnel engaged in the contract research, third-party consulting and subcontractor 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.

During 2019, we are projecting growth in revenue as a result of expected volume growth in our core petrochemical and refinery markets, an anticipated increase in project-based demand, particularly in the subsea and LNG markets, and our expectation of increased penetration of new markets, including the building materials market. In addition, we implemented a price increase for 2019 designed to offset recent increases in raw material costs and to improve gross profit margins. We also expect manufacturing expenses w ill grow during 2019 at a rate significantly lower than projected growth in product revenue due to the high proportion of fixed manufacturing expense in our manufacturing operations. As a result, we expect gross profit to improve both in absolute dollars and as a percentage of revenue during 2019.

In the longer term, we expect gross profit to continue to increase in absolute dollars and as a percentage of revenue due to expected increases in total revenue, production volumes and manufacturing productivity. In addition, we expect the increases in revenue, volume and productivity will be supported by the implementation of lower cost product formulations 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.

During 2019, we project a significant decrease in operating expenses both in absolute dollars and as a percentage of revenue versus 2018. The expected decrease in operating expenses both in absolute dollars and as a percentage of revenue principally reflects our expectation that impairments and reserves during 2019 will be of a significantly lower magnitude than the impairment charge of $7.4 million on construction in progress and the $2.9 million reserve for uncollectible accounts receivable that we incurred during 2018 . In the longer term, we expect that operating expenses will increase in absolute dollars, but decrease as a percentage of revenue.

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 exp enses will increase in absolute dollars but decrease as a percentage of revenue in the longer term, in 2019 we expect such expenses will increase both in absolute dollars and 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 have expanded our sales force and sales consultants globally to drive anticipated growth in customers and demand for our products. We expect that sales and marketing expenses will increase in absolute dollars but decrease as a percentage of revenue in both 2019 and in the longer term.

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. We also expect that the patent enforcement actions, described in more detail under “Legal Proceedings” in Part II, Item 1 of this Quarterly Report on Form 10-Q, if protracted, could result in significant legal expense over the medium to long-term. During 2019, we expect general and administrative expense will decrease both in absolute dollars and as a percentage of revenue due primarily to an expected reduction in the provision for uncollectible accounts receivable versus those in 2018. 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.

Interest Expense, Net

Interest expense, net consists primarily of fees and interest expense 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.

Results of Operations

Three months ended March 31, 2019 compared to the three months ended March 31, 2018

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

Revenue

	Three Months Ended March 31,				Change	
	2019		2018			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Revenue:						
Product	$ 26,785	96%	$ 22,521	98%	$ 4,264	19%
Research services	1,127	4%	553	2%	574	104%
Total revenue	$ 27,912	100%	$ 23,074	100%	$ 4,838	21%

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

	Three Months Ended March 31,		Change	
	2019	2018	Amount	Percentage
Product shipments in square feet (in thousands)	8,685	7,742	943	12%

Total revenue increased $4.8 million, or 21%, to $27.9 million for the three months ended March 31, 2019 from $23.1 million in the comparable period in 2018 primarily as a result of an increase in product revenue.

Product revenue increased by $4.3 million, or 19%, to $26.8 million for the three months ended March 31, 2019 from $22.5 million in the comparable period in 2018. This increase was principally the result of an increase in project work in the subsea market, growth in the petrochemical and refinery markets, particularly in North America and Europe, and the impact of price increases enacted in early 2019.

Product revenue for the three months ended March 31, 2019 included $5.6 million to a North American distributor and $4.5 million to a European based subsea contractor. Product revenue for the three months ended March 31, 2018 included $6.7 million to a North American distributor and $4.0 million to an Asian distributor.

The average selling price per square foot of our products increased by $0.17, or 6%, to $3.08 per square foot for the three months ended March 31, 2019 from $2.91 per square foot for the three months ended March 31, 2018. The increase in average selling price principally reflected the impact of price increases enacted in early 2019. This increase in average selling price had the effect of increasing product revenue by $1.5 million for the three months ended March 31, 2019 from the comparable period in 2018.

In volume terms, product shipments increased by 1.0 million square feet, or 12%, to 8.7 million square feet of aerogel products for the three months ended March 31, 2019, as compared to 7.7 million square feet for the three months ended March 31, 2018. The increase in product volume had the effect of increasing product revenue by $2.8 million for the three months ended March 31, 2019 from the comparable period in 2018.

Research services revenue increased $0.5 million, or 104%, to $1.1 million for the three months ended March 31, 2019 from $0.6 million in the comparable period in 2018. The increase was primarily due to the timing and amount of funding available under existing research contracts during the three months ended March 31, 2019 versus the comparable period in 2018.

Product revenue was 96% of total revenue for the three months ended March 31, 2019 and 98% for the three months March 31, 2018. Research services revenue was 4% of total revenue for the three months ended March 31, 2019 and 2% of total revenue for the three months ended March 31, 2018.

Cost of Revenue

	Three Months Ended March 31,							
	2019			2018			Change	
	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage
	($ in thousands)							
Cost of revenue:								
Product	$ 23,478	88%	84%	$ 20,023	89%	87%	$ 3,455	17%
Research services	716	64%	3%	241	44%	1%	475	197%
Total cost of revenue	$ 24,194	87%	87%	$ 20,264	88%	88%	$ 3,930	19%

Total cost of revenue increased $3.9 million, or 19%, to $24.2 million for the three months ended March 31, 2019 from $20.3 million in the comparable period in 2018. The increase in total cost of revenue was primarily the result of an increase in product cost of revenue.

Product cost of revenue increased by $3.5 million, or 17%, to $23.5 million for the three months ended March 31, 2019 from $20.0 million in the comparable period in 2018. The $3.5 million increase was the result of a $3.8 million increase in material costs, offset, in part, by a $0.3 million decrease in manufacturing expense. The increase in material costs was driven principally by the increase in the cost of silica materials, which constitute over 50% of the cost of our raw materials, and the 1.0 million square foot, or 12%, increase in product shipments. The decrease in manufacturing expense was the result of decreases in depreciation expense of $0.6 million and maintenance expense of $0.3 million, offset, in part, by an increases in other expenses of $0.4 million and compensation and related costs of $0.2 million.

Product cost of revenue as a percentage of product revenue decreased to 88% during the three months ended March 31, 2019 from 89% during the three months ended March 31, 2018. This decrease was the result of the high proportion of fixed manufacturing expenses that remained essentially unchanged despite a 19% increase in product revenue for the three months ended March 31, 2019 from the comparable period in 2018.

Research services cost of revenue increased $0.5 million, or 197%, to $0.7 million for the three months ended March 31, 2019 from $0.2 million for the comparable period in 2018. Cost of research service revenue as a percentage of research servi ces revenue increased to 64% during the three months ended March 31, 2019 from 44% in the comparable period in 2018 due to an increase in the proportion of outside services utilized to support the contracted research.

Gross Profit

	Three Months Ended March 31,				Change	
	2019		2018			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Gross profit	$ 3,718	13%	$ 2,810	12%	$ 908	32%

Gross profit increased by $0.9 million, or 32%, to $3.7 million for the three months ended March 31, 2019 from $2.8 million in the comparable period in 2018. The increase in gross profit was the result of the $4.8 million increase in total revenue, offset, in part, by the $3.9 million increase in total cost of revenue. The increase in revenue was principally associated with the increase in project work in the subsea market, the growth in the petrochemical and refinery markets, particularly in North America and Europe, and the price increases enacted in early 2019. The increase in material costs was driven principally by the increase in the cost of silica materials, which constitute over 50% of the cost of our raw materials, and the 1.0 million square foot, or 12%, increase in product shipments.

Gross profit as a percentage of total revenue increased to 13% of total revenue for the three months ended March 31, 2019 from 12% in the comparable period in 2018.

Research and Development Expenses

	Three Months Ended March 31,				Change	
	2019		2018			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Research and development expenses	$ 1,928	7%	$ 1,605	7%	$ 323	20%

Research and development expenses increased by $0.3 million, or 20%, to $1.9 million for the three months ended March 31, 2019 from $1.6 million in the comparable period in 2018. The increase was primarily the result of an increase in compensation and related costs.

Research and development expenses as a percentage of total revenue remained unchanged at 7% for the three months ended March 31, 2019 from the comparable period in 2018.

Sales and Marketing Expenses

	Three Months Ended March 31,				Change	
	2019		2018			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Sales and marketing expenses	$ 3,511	13%	$ 3,499	15%	$ 12	0%

Sales and marketing expenses of $3.5 million increased by less than $0.1 million, or less than 1%, from the comparable period in 2018. The less than $0.1 million increase was the result of increases in compensation and related costs of $0.2 million, offset, in part, by decreases in commissions and professional fees of $0.1 million and other sales and marketing expenses of $0.1 million.

Sales and marketing expenses as a percentage of total revenue decreased to 13% for the three months ended March 31, 2019 from 15% in the comparable period in 2018 due primarily to the increase in revenue during the three months ended March 31, 2019.

General and Administrative Expenses

	Three Months Ended March 31,				Change	
	2019		2018			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
General and administrative expenses	$ 4,240	15%	$ 4,456	19%	$ (216)	(5)%

General and administrative expenses decreased by $0.2 million, or 5%, to $4.2 million during the three months ended March 31, 2019 from $4.4 million in the comparable period in 2018. The $0.2 million decrease was the result of decreases in professional fees of $0.2 million and other general and administrative expenses of $0.2 million, offset, in part, by an increase in patent enforcement costs of $0.2 million.

General and administrative expenses as a percentage of total revenue decreased to 15% for the three months ended March 31, 2019 from 19% in the comparable period in 2018 due primarily to the increase in revenue during the three months ended March 31, 2019.

Interest Expense, net

	Three Months Ended March 31,				Change	
	2019		2018			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Interest expense, net	$ (41)	(0)%	$ (92)	(0)%	$ 51	(55)%

Interest expense, net, consists primarily of fees and interest expense associated with outstanding balances under our revolving credit agreement and was less than $0.1 million during both the three months ended March 31, 2019 and the comparable period in 2018.

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, 2017 and 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 have initiated a plan to increase the capacity of our East Providence, Rhode Island manufacturing facility to approximately 60 million square feet of aerogel blankets by the end of 2020. We expect to incur up to an additional $12.0 million in expenditures related to this plan through 2020.

We believe that our existing cash balance and available credit will be sufficient to fund a portion of the planned expansion of our East Providence manufacturing facility and other strategic business initiatives. During January 2019, we received a second $5.0 million prepayment pursuant to the supply agreement with BASF. On March 4, 2019, we extended the maturity of our revolving credit facility to April 28, 2020. In addition, we plan to manage other capital expenditures and working capital balances during 2019 and 2020 to maintain the cash resources required to support current operating requirements.

However, we will need to supplement our cash balance and available credit with anticipated cash flows from operations, debt financings, customer prepayments, technology licensing agreements or equity financings to provide the capital required to complete the planned expansion of our existing manufacturing facility and to fund other strategic business initiatives .

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 March 31, 2019, we had $3.4 million of cash and cash equivalents.

At March 31, 2019, we had debt obligations of $3.3 million related to borrowings under our revolving credit facility with Silicon Valley Bank, $0.5 million of outstanding letters of credit secured by the revolving credit facility and an obligation of $10.0 million associated with prepayments received pursuant to our supply agreement with BASF.

We have maintained the revolving credit facility, as amended from time to time, with Silicon Valley Bank since March 2011. On March 4, 2019, our revolving credit facility was amended to extend the maturity date of the facility to April 28, 2020. The amendment to the credit facility also (i) revised the definition of "Borrowing Base" to remove the eligible inventory component of the Borrowing Base, (ii) removed the Adjusted Quick Ratio financial covenant set forth in the loan agreement and (iii) established certain minimum EBITDA levels with respect to the minimum EBITDA financial covenant for the extended term.

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.

Under the revolving credit facility, we are required to comply with both non-financial and financial covenants, including the minimum EBITDA covenant, as defined in the loan agreement. At March 31, 2019, we were in compliance with all such covenants.

The effective amount available to us under the facility at March 31, 2019 was $7.1 million after giving effect to the $3.3 million of borrowings and $0.5 million of letters of credit outstanding.

Analysis of Cash Flow

Net Cash Used in Operating Activities

During the three months ended March 31, 2019, we used $3.0 million in net cash in operating activities, as compared to the use of $2.4 million in net cash during the comparable period in 2018, an increase in the use of cash of $0.6 million. This increase in use of cash was the result of increases in cash used by changes in operating assets and liabilities of $0.8 million, offset, in part, by a decrease in net loss adjusted for non-cash items of $0.2 million.

Net Cash Used in 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 the three months ended March 31, 2019 and 2018 was $0.6 million and $0.7 million, respectively, in capital expenditures primarily for machinery and equipment to improve the capacity, throughput and efficiency of our East Providence facility.

Net Cash Used in Financing Activities

Net cash provided by financing activities for the three months ended March 31, 2019 totaled $3.7 million and consisted of $36.9 million in borrowings under our line of credit and $5.0 million in prepayment proceeds under our supply agreement with BASF, offset, in part, by $37.8 million of repayments under our line of credit and $0.4 million in cash used for payments made for employee tax withholdings associated with the vesting of restricted stock units.

Net cash provided by financing activities for the three months ended March 31, 2018 totaled $2.0 million and consisted of $2.5 million in prepayment proceeds under our supply agreement with BASF, offset, in part, by $0.5 million in cash used for payments made for employee tax withholdings associated with the vesting of restricted stock units.

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

There have been no material changes to our contractual obligations and commitments as reported in our Annual Report.

Recent Accounting Pronouncements

Information regarding new accounting pronouncements is included in note 2 to our unaudited consolidated financial statements contained in Item 1 of this Quarterly Report on Form 10-Q.

Critical Accounting Policies and Estimates

Our financial statements are prepared in accordance with U.S. GAAP. 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 our Annual Report and note 2 to our consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q for information about these critical accounting policies, as well as a description of our other significant accounting policies.

Certain Factors That May Affect Future Results of Operations

The SEC encourages companies to disclose forward-looking information so that investors can better understand a company’s future prospects and make informed investment decisions. This Quarterly Report on Form 10-Q contains such “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. These statements involve known and unknown risks, uncertainties and other important factors which may cause our actual results, performance or achievements to be materially different from any future results, performances or achievements expressed or implied by the forward-looking statements. Forward-looking statements include, but are not limited to, statements about: our beliefs in the appropriateness of our assumptions, the accuracy of our estimates regarding expenses, loss contingencies, future revenues, future profits, uses of cash, available credit, capital requirements, and the need for additional financing; the performance of our aerogel blankets; our expectation that we will be successful in obtaining, enforcing and defending our patents against competitors and that such patents are valid and enforceable; 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 in our East Providence, Rhode Island manufacturing facility; our estimates of annual production capacity; our strategic partnership with BASF and the potential benefits of such a relationship, including the potential for it to create new product and market opportunities; the BASF Supply Agreement, our supply to BASF of its Spaceloft A2 product and newly developed product, the potential for future cash advances from BASF under the BASF Supply Agreement (payment of which are subject to certain conditions) to provide a source of financing for some portion of the cost of the planned capacity expansion in our East Providence, Rhode Island manufacturing facility and the potential for BASF to become a significant customer for our products; our joint development agreement with BASF, and the potential for it to support the development of new aerogel products and technologies; our beliefs about the usefulness of the square foot operating metric; our beliefs about the financial metrics that are indicative of our core performance; our beliefs about the usefulness of our presentation of Adjusted EBITDA; our expectations about the effect of manufacturing capacity on financial metrics such as Adjusted EBITDA; 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 beliefs about the outcome, effects or estimated costs of current or potential litigation or their respective timing, including expected legal expense in connection with our patent enforcement actions; our plans to devote substantial resources to the development of new aerogel technology; our expectations about product mix; our expectations about future material costs and manufacturing expenses as a percentage of revenue; our expectations of future gross profit and the effect of manufacturing expenses, manufacturing capacity and productivity on gross profit; our expectations about our resources and other investments in new technology and related research and development activities and associated expenses; our expectations about short and long term (a) research and development (b) general and administrative and (c) sales and marketing expenses; our expectations of revenue growth, increased gross profit, and improving cash flows over the long term; our intentions about managing capital expenditures and working capital balances; our expectations about incurring significant capital expenditures in the future; our expectations about the expansion of our workforce and resources and its effect on sales and marketing, general and administrative, and related expenses; our expectations about future product revenue and demand for our products; our expectations about the effect of stock based compensation on various costs and expenses; our expectations about potential sources of future financing; our beliefs about the impact of accounting policies on our financial statements; our beliefs about the effect of interest rates, inflation and foreign currency fluctuations on our results of operations and financial condition; and our beliefs about the expansion of our international operations.

Words such as “may,” “will,” “anticipate,” “estimate,” “expects,” “projects,” “intends,” “plans,” “believes” and words and terms of similar substance used in connection with any discussion of future operating or financial performance, identify forward-looking statements. All forward-looking statements are management’s present expectations of future events and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those described in the forward-looking statements. These risks include, but are not limited to, those set forth in this Quarterly Report on Form 10-Q and under the heading "Risk Factors" contained in Item 1A of our Annual Report.

In light of these assumptions, risks and uncertainties, the results and events discussed in the forward-looking statements contained in this Quarterly Report on Form 10-Q might not occur. Stockholders and other readers are cautioned not to place undue reliance on the forward-looking statements, which speak only as of the date of this Quarterly Report on Form 10-Q. We are not under any obligation, and we expressly disclaim any obligation, to update or alter any forward-looking statements, whether as a result of new information, future events or otherwise. All subsequent forward-looking statements attributable to Aspen Aerogels, Inc. or to any person acting on its behalf are expressly qualified in their entirety by the cautionary statements contained or referred to in this section.

Item 3. 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 March 31, 2019, we had unrestricted cash and cash equivalents of $3.4 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 March 31, 2019, we had $3.3 million drawn and outstanding on our revolving credit facility. At March 31, 2019, we also had $0.5 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, 2020.

At March 31, 2019, the amount available to us under the revolving credit facility was $7.1 million after giving effect to the $3.3 million in borrowings and $0.5 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 4. 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 (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 March 31, 2019, our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiven ess 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 c oncluded that, as of March 31, 2019, 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 reporte d 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 a llow timely decisions regarding required disclosure.

(b) *Changes in Internal Controls* .

During the three months ended March 31, 2019, 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, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II — OTHE R INFORMATION

Item 1. Legal Proceedings.

Patent Enforcement Actions

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 International Trade Commission, or 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 our 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 Administrative Law Judge, or 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 infringed. 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 is enforced by the United States Customs and Border Protection, is currently in effect. In June 2018, Alison has filed a notice of appeal seeking a review of the ITC determination and order by the United States Court of Appeals for the Federal Circuit (CAFC). In its opening brief filed in September 2018, Alison has sought an appeal of ITC's finding that a product composition patent asserted by us against Alison is valid and infringed. As neither respondents appealed the ITC findings of validity or infringement with respect to asserted process patents, the exclusion order remains valid and enforced irrespective of the outcome of the appeal. In addition to Respondents' contention at the ITC that the asserted patents were invalid, Alison also filed petitions with the United States Patent and Trademark Office, or USPTO, requesting Inter-Partes Review to cancel certain claims in three of our 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, 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 May 2018, Alison filed another request seeking invalidation of one of our manufacturing process patents at SIPO, the same patent that it previously sought to invalidate and subsequently withdrew the request in 2017. After conducting an oral proceeding on September 6, 2018, the Patent Reexamination Board of SIPO, or PRB, issued a decision on October 26, 2018 holding Aspen's issued patent as amended as valid. Alison has appealed the PRB's decision to the Beijing IP court. The appeal is currently ongoing.

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. Nano and Alison also initiated a nullity actions in German Federal Patent Court in Munich against our asserted German patents. On the first patent, EP1638750 (750 Patent) challenged at the Federal Patent Court, on September 25, 2018 the Court conducted an oral proceeding and determined that the patent is valid as originally issued and dismissed the challenge to its validity. They likewise filed an opposition to one of the asserted patents at the European Patent Office, or EPO. In December 2018, EPO determined the patent was invalid on formality grounds and decided to revoke it. Such determination is subject to an appeal to the EPO Board of appeals. On March 8, 2019, Mannheim court issued two separate judgments in cases against Nano and Alison, respectively. The Mannheim court determined that both Nano and Alison are infringing on Aspen's '750 Patent in connection with their respective products. The court also issued injunctions prohibiting the offer, putting on the market, using, importing or possessing the infringing products. The court found the defendants liable to us for damages since September 22, 2012. The court also ordered the defendants to provide information on the scope of the acts of infringement committed since August 22, 2012, and a recall of infringing products. The court also ordered Nano and Alison to bear the costs of the legal proceedings and reimburse statutory attorneys' costs and expenses to us, that exact amount of which is yet to be determined. Nano and Alison may appeal the judgments of the Mannheim court within 30 days from the date they have been served with the decision, respectively. On March 19 and 20, 2019 the German Federal Patent Court in Munich conducted oral proceedings and voided four claims in EP2415577 and confirmed the validity of challenged claims in EP2422950 within the scope of silica gels. Written decisions are expected in due course. Additionally, a reseller of Nano's products in Taiwan challenged the validity of one of our patents in Taiwan. After careful review of our response, Taiwanese patent office has determined the patent as valid and dismissed the challenge in December 2018. LG Chem Ltd. has sought to challenge one of our patents in Korea. The resulting patent invalidation trial is ongoing.

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.

Brazilian Enforcement Action

In August 2018, we filed an enforcement suit against Qualiman Engenharia E Montagens LTDA, or Qualiman, one of our South American customers, in civil court in Sao Paulo, Brazil seeking payment of past due invoices totaling approximately $2.9 million. In October 2018, the Brazilian court ruled in our favor with respect to Qualiman's obligation to pay us immediately. As part of the remedy, the Court ordered Qualiman's customer, Petroleo Brasilero S.A., or Petrobras, to redirect part of its payments to Qualiman to a court-administered bank account and other appropriate actions. Subsequently, we learned that Qualiman has laid off a substantial portion of its installers and threatened to walk away from Petrobras' contract. In connection with such layoffs, a Brazilian labor court is addressing reparations to laid-off workers. From the minutes of such labor court proceedings, we learned that Petrobras and Qualiman are seeking to renegotiate the contract between them in connection with this project. On February 26, 2019, an appeals court dismissed Qualiman's appeal of the decision of the Sao Paulo civil court on the merits. The recovery of money owed is ongoing and is subject to the liquidity of Qualiman.

Item 1A. Risk Factors.

There have been no material changes to the risk factors included in our Annual Report.

Item 2. 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* . Not applicable.

(c) *Purchases of Equity Securities By the Issuer and Affiliated Purchasers* . We did not repurchase any of our equity securities during the quarter ended March 31, 2019.

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not applicable.

Item 5. Other Information.

None.

Item 6. E xhibits.

(a) Exhibits

10.1* †	First Addendum to the Amended and Restated Supply Agreement dated January 14, 2019 by and between BASF Polyurethanes GmbH and the Company.
10.2*	Ninth Amendment to the Amended and Restated Loan and Security Agreement, dated March 4, 2019, by and between the Company and Silicon Valley Bank.
31.1	Certification of principal executive officer under Section 302(a) of the Sarbanes-Oxley Act of 2002.
31.2	Certification of principal financial officer under Section 302(a) of the Sarbanes-Oxley Act of 2002.
32	Certifications of the principal executive officer and the principal financial officer under Section 906 of the Sarbanes-Oxley Act of 2002.
101	The following materials from Aspen Aerogels, Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, formatted in XBRL (eXtensible Business Reporting Language): (i) the Consolidated Balance Sheets (unaudited) as of March 31, 2019 and December 31, 2018, (ii) the Consolidated Statements of Operations (unaudited) for the three months ended March 31, 2019 and 2018, (iii) the Consolidated Statements of Stockholders' Equity (unaudited) for the three months ended March 31, 2019 and 2018 (iv) the Consolidated Statements of Cash Flows (unaudited) for the three months ended March 31, 2019 and 2018, and (v) the Notes to Consolidated Financial Statements (unaudited).

* Filed herewith

† Certain confidential portions of this Exhibit were omitted by means of marking such portions with an asterisk because the identified confidential portions (i) are not material and (ii) would be competitively harmful if publicly disclosed.

SIGNA TURES

Pursuant to the requirements 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: May 2, 2019

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

Date: May 2, 2019

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

Exhibit 10.1

First Addendum to the Amended and Restated Supply Agreement

This first addendum ("First Addendum") to the Amended and Restated Supply Agreement dated February 16, 2018 (the "AR Agreement") between BASF Polyurethanes GmbH, with a principal place of business at Elastogranstralβe 60, 49443 Lemforde, Germany ("BASF") and Aspen Aerogels, Inc., with a principal place of business at 30 Forbes Road, Building B, Northborough, Massachusetts, 01532, USA ("ASPEN") concerning supply of Products by ASPEN to BASF is effective as of the latest date set forth in the signature block below. Capitalized terms used herein that are not otherwise defined below, have the meanings ascribed to them in the AR Agreement.

WHEREAS, ASPEN and BASF's parent, BASF SE have entered into a Joint Development Agreement dated June 21, 2016 ("JDA") and a Project Charter dated March 1, 2017 ("Charter") pursuant to which a [***] product has been developed;

WHEREAS, BASF SE and ASPEN are also engaged in the negotiation of the terms and conditions under which BASF or its parent, BASF SE and ASPEN may commercialize Developed Product, which terms and conditions may include [***] between ASPEN and BASF or their Affiliates;

WHEREAS, the Parties desire that ASPEN manufacture and supply to BASF and BASF provide samples of Developed Product to targeted customers in a [***] BASF desires that ASPEN reconfigure ASPEN's facility to manufacture Developed Product in agreed quantities and supply to BASF through [***];

WHEREAS, ASPEN and BASF have agreed to negotiate in good faith to commercialize Developed Product pursuant to and as contemplated in Section 9 of the Charter and Sections 3.8, 3.9 and 4.2 of the JDA including a potential investment in [***];

WHEREAS, the Parties desire to amend the AR Agreement to incorporate Developed Product as an additional Product to be supplied under that agreement, to agree on another Pre-Payment Tranche to support Aspen's efforts to supply Developed Products in the agreed quantities hereunder and to establish conditions related to repayment of the same;

NOW, THEREFORE, in consideration of the foregoing, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. Definitions: The following terms shall be added to the Definitions section of the AR Agreement:

"Developed Product"	[***] product meeting the specification attached to this First Addendum as Annex 2.
"Total Volume Range"	in connection with Developed Product shall mean the [***] and thereafter.
"[***] Markets"	shall have the meaning as defined in Annex 1 hereto.
"Pre-Commercialization Period"	shall have the meaning described in the first sentence of Section 4 below.

[***] = CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT, MARKED BY BRACKETS, HAS BEEN OMITTED BECAUSE THE INFORMATION (I) IS NOT MATERIAL AND (II) WOULD BE COMPETITIVELY HARMFUL IF PUBLICLY DISCLOSED.

2. Developed Product shall be deemed a new product for purposes of the AR Agreement. ASPEN shall deliver Developed Product to BASF up to Total Volume Range in the applicable calend ar year. The price of such Developed Product shall be the sum of (i) [***], plus (ii) [***] subject to change as of the date of this First Addendum. Specification may also be changed. Parties shall negotiate in good faith, any modifications to this Addendu m to minimize, to the extent possible, any adverse impact of such changes on manufacturing and related costs.

3. The Parties acknowledge that [***]supported by Pre-Payment Tranches that impact the efficiency of the current production process for Spaceloft A2 may reduce the Standard Cost of Spaceloft A2. Pursuant to the Side Agreement for Spaceloft A2, a reduction in Standard Cost of Spaceloft A2 will result in a reduction in the price of Spaceloft A2. The Parties are targeting a reduction in the cost of Spaceloft A2 by [***].

4. For a period from effective date hereof until [***], BASF shall use the Developed Product supplied hereunder to sell, supply and assess demand in the [***] Markets whereby ASPEN shall use Developed Product to sell, supply and assess demand in markets other than the [***] Markets ("Pre-Commercialization Period"). . During the Pre-Commercialization Period Parties shall share demand assessments with each other to advance commercialization negotiations and shall negotiate the terms and conditions of the commercialization of Developed Product as set forth in Section 9 of the Charter and Section 3.8 of the JDA ("TERMS"). At the end of the Pre-Commercialization Period, if the Parties in good faith are unable to agree to the TERMS, the provisions of Section 3.9 and 4.2 of the JDA shall apply. The mutual exclusivity described in the first sentence of this Section 4 shall replace any exclusivity arising from Section 1.1 of AR Agreement with respect to Developed Product.

5. Aspen shall provide a certificate of analysis to BASF on the properties tested on Developed Product shipped to BASF to ensure that the regularly tested properties comply with their respective requirements in the product specifications as in Annex 2;

6. The AR Agreement shall be extended, only with respect to Developed Product, until [***]. However, nothing in this First Addendum shall change the terms of the AR Agreement with respect to any other Product, and with respect to SPACELOFT A2, except to the extent as expressly provided in Section 7(4) below.

7. A new subsection E shall be added as an amendment to Annex 4 satisfying the obligations of Annex 4, Section C as follows:

E. Pre-Payment Tranche 2

(1) BASF will remit to ASPEN by wire transfer five million U.S dollars ($5,000,000) no later than January 31, 2019.

(2) The Target Date with respect to Pre-Payment Tranche 2 shall be December 31, 2022.

(3) After January 1, 2020, ASPEN will credit up to fifty percent (50%) of any amounts invoiced by ASPEN for Developed Product sold and delivered to BASF pursuant to this First Addendum against the available Pre-Payment Balance originating from this Pre-Payment Tranche 2.

[***] = CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT, MARKED BY BRACKETS, HAS BEEN OMITTED BECAUSE THE INFORMATION (I) IS NOT MATERIAL AND (II) WOULD BE COMPETITIVELY HARMFUL IF PUBLICLY DISCLOSED.

(4) If, as of the Target Date, credits associated with the sale and delivery of Developed Products have not fully covered the value of Pre-Payment Tranche 2, BASF may upon its sole discret ion request, as an alternative to the credit set forth in E. (3) above or the repayment set forth in E. (5) below, that ASPEN instead credit 24.7% of any amounts invoiced by ASPEN for SPACELOFT A2 against the available Pre-Payment Balance from this Pre-Pay ment Tranche 2 ("Alternative Credit"). The Alternative Credit shall be in addition to credits available on amounts invoiced by ASPEN for SPACELOFT A2, if any, associated with Pre-Payment Tranche 1.

(5) As set forth in Section 5.2 of the AR Agreement, BASF may alternatively request, upon six weeks prior written notice, from ASPEN the repayment of the remainder of the available Pre-Payment Balance from this Pre-Payment Tranche 2, if any, at any time at or after the Target Date.

(6) The Pre-Payment Balance from this Pre-Payment Tranche 2 may be repaid by ASPEN to BASF at any time in whole or in part and for any reason.

8. This First Addendum is intended by the Parties to be an amendment meeting the requirements of Section 13.1 of the AR Agreement.

9. Nothing in this First Addendum modifies AR Agreement with respect to supply of SPACELOFT A2 except with respect to Alternative Credit; and Parties expect supply of SPACELOFT A2 and Developed Product to occur in parallel, as necessary.

IN WITNESS WHEREOF, the parties have executed this First Addendum as of the dates set forth below.

ASPEN AEROGELS, INC.	**BASF POLYURETHANES GMBH**	
/s/ Donald R. Young	[***]	[***]
Name: Donald R. Young	Name: [***]	Name: [***]
Title: President & CEO	Title: [***]	Title: [***]
Date: Jan 14 2019	Date: 11.1.2019	Date: 10.01.2019

[***] = CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT, MARKED BY BRACKETS, HAS BEEN OMITTED BECAUSE THE INFORMATION (I) IS NOT MATERIAL AND (II) WOULD BE COMPETITIVELY HARMFUL IF PUBLICLY DISCLOSED.

Annex 1— [***] Markets

Market definitions are aligned to and based on categorization of markets set forth [***] as of [***].

[***] Markets will be limited strictly to those markets specifically identified as approved below. Parties, upon mutual consent, make any additions or modifications to [***] Markets after the date hereof in writing.

1. [***]

2. [***].

3. [***].

4. [***].

[***].

[***] = CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT, MARKED BY BRACKETS, HAS BEEN OMITTED BECAUSE THE INFORMATION (I) IS NOT MATERIAL AND (II) WOULD BE COMPETITIVELY HARMFUL IF PUBLICLY DISCLOSED.

Annex 2 - SPECIFICATION FOR DEVELOPED PRODUCT

[***]

[***] = CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT, MARKED BY BRACKETS, HAS BEEN OMITTED BECAUSE THE INFORMATION (I) IS NOT MATERIAL AND (II) WOULD BE COMPETITIVELY HARMFUL IF PUBLICLY DISCLOSED.

Exhibit 10.2

NINTH A MENDMENT
TO
AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT

This Ninth Amendment to Amended and Restated Loan and Security Agreement (this " **Amendment** ") is entered into this 4th day of March, 2019 by and between **SILICON VALLEY BANK** (" **Bank** ") and **ASPEN AEROGELS, INC.** , a Delaware corporation (" **Borrower** ") whose address is 30 Forbes Road, Building B, Northborough, Massachusetts 01532.

Recitals

A. Bank and Borrower have entered into that certain Amended and Restated Loan and Security Agre ement dated as of September 3, 2014, as amended by that certain Consent and First Amendment to Amended and Restated Loan and Security Agreement dated as of August 19, 2016, as further amended by that certain Second Amendment to Amended and Restated Loan and Security Agreement dated as of November 23, 2016, as further amended by that certain Third Amendment to Amended and Restated Loan and Security Agreement dated as of December 29, 2016, as further amended by that certain Fourth Amendment to Amended and Restated Loan and Security Agreement dated as of January 27, 2017, as further amended by that certain Fifth Amendment to Amended and Restated Loan and Security Agreement dated as of September 27, 2017, as further amended by that certain Consent and Sixth Amendment to Amended and Restated Loan and Security Agreement dated as of January 25, 2018, as further amended by that certain Seventh Amendment to Amended and Restated Loan and Security Agreement dated as of April 25, 2018, and as further amended by that certain Eighth Amendment to Amended and Restated Loan and Security Agreement and First Amendment to Preemptive Forbearance and Conditional Waiver Agreement dated as of November 30, 2018 (as amended, and as the same may from time to time be further amended, restated, amended and restated, modified and/or supplemented, the " **Loan Agreement** ").

B. Bank and Borrower are party to that certain Preemptive Forbearance and Conditional Waiver Agreement dated as of May 31, 2018 (the " **May Conditional Waiver** ").

C. Bank and Borrower are party to that certain Preemptive Forbearance and Conditional Waiver Agreement dated as of August 30, 2018, as amended by that certain Eighth Amendment to Amended and Restated Loan and Security Agreement and First Amendment to Preemptive Forbearance and Conditional Waiver Agreement dated as of November 30, 2018, and as further amended by that certain Second Amendment to Preemptive Forbearance and Conditional Waiver Agreement dated as of December 28, 2018 (as amended, and as the same may from time to time be further amended, restated, amended and restated, modified and/or supplemented, the " **August Conditional Waiver** " and, together with the May Conditional Waiver, the " **Conditional Waivers** ").

D. Bank has extended credit to Borrower for the purposes permitted in the Loan Agreement.

E. Borrower has requested that Bank amend the Loan Agreement to make certain revisions to the Loan Agreement as more fully set forth herein.

F. Bank has agreed to so amend certain provisions of the Loan Agreement, but onl y to the extent, in accordance with the terms, subject to the conditions and in reliance upon the representations and warranties set forth below.

Agreement

Now, Therefore, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, and intending to be legally bound, the parties hereto agree as follows:

1. **Definitions.** Capitalized terms used but not defined in this Amendment shall have the meanings given to them in the Loan Agreement.

2. Amendments to Loan Agreement.

2.1 Section 3.4(a) (Procedures for Borrowing) . Subsection (a) of Section 3.4 is amended in its entirety and replaced with the following:

"(a) Subject to the prior satisfaction of all other applicable conditions to the making of an Advance set forth in this Agreement, an Advance shall be made upon Borrower's irrevocable written notice delivered to Bank in the form of a Notice of Borrowing o r without instructions if any Advances is necessary to meet Obligations which have become due, and such Notice of Borrowing shall indicate whether Borrower is requesting an Advance with respect to Eligible Accounts or Eligible Foreign Accounts, as applicable. The Notice of Borrowing shall be made by Borrower through Bank's online banking program, provided, however, if Borrower is not utilizing Bank's online banking program, then such Notice of Borrowing shall be in the form attached hereto as Exhibit C and shall be executed by an Authorized Signer. The Notice of Borrowing must be received by Bank prior to 12:00 p.m. Eastern time, (i) at least three (3) Business Days prior to the requested Funding Date, in the case of any LIBOR Advance, and (ii) on the requested Funding Date, in the case of a Prime Rate Advance, specifying: (1) the amount of the Advance; (2) the Currency in which such Advance shall be denominated; (3) the requested Funding Date; (4) whether the Advance is to be comprised of LIBOR Advances or Prime Rate Advances; and (5) the duration of the Interest Period applicable to any such LIBOR Advances included in such notice; provided that if the Notice of Borrowing shall fail to specify the duration of the Interest Period for any Advance comprised of LIBOR Advances, such Interest Period shall be one (1) month. In addition to such Notice of Borrowing, when a Streamline Period is not in effect, Borrower must promptly deliver to Bank by electronic mail or through Bank's online banking program such reports and information, including without limitation, sales journals, cash receipts journals, accounts receivable aging reports, as Bank may request in its sole discretion."

2.2 Section 5.3(c) (Accounts Receivable; Inventory) . Subsection (c) of Section 5.3 is deleted in its entirety and intentionally omitted.

2.3 Section 6.2(b) (Financial Statements, Reports, Certificates) . Subsection (b) of Section 6.2 is amended in its entirety and replaced with the following:

"(b) within twenty (20) days after the end of each mon th, (A) monthly accounts receivable agings, aged by invoice date, (B) monthly accounts payable agings, aged by invoice date, and outstanding or held check registers, if any, and (C) monthly reconciliations of accounts receivable agings (aged by invoice date), transaction reports, Deferred Revenue report, and general ledger;"

2.4 Section 6.9 (Financial Covenants) . Section 6.9 is amended in its entirety and replaced with the following:

" **6.9 Financial Covenant** . Borrower shall achieve, measured as of the end of each fiscal quarter during the following periods, EBITDA of at least (loss not worse than) the following for the following periods:

Period	**Minimum EBITDA (maximum loss)**
Trailing three (3) month period ending March 31, 2019	($4,500,000)
Trailing six (6) month period ending June 30, 2019	($5,000,000)

Trailing nine (9) month period ending September 30, 2019	($5,500,000)
Trailing twelve (12) month period ending December 31, 2019	($4,500,000)

2.5 The contact information for the Bank's counsel set forth in Section 10 is hereby amended in its entirety and replaced with the following:

"Morrison & Foerster LLP
200 Clarendon Street, 20th Floor
Boston, Massachusetts 02116
Attention: Charles W. Stavros, Esq.
Facsimile No.: (617) 830-0460
E-Mail: cstavros@mofo.com "

2.6 **Section 13** (**Definitions**). The following term and its definition set forth in Section 13.1 is amended in its entirety and replaced with the following:

" **Borrowing Base** " is (a) eighty percent (80%) of Eligible Accounts, plus (b) eighty percent (80%) of Eligible Foreign Accounts (provided , however , Eligible Foreign Accounts that are billed in a Foreign Currency shall have an advance rate of seventy percent (70%); and provided , further , that to the extent Eligible Foreign Accounts include BASF Receivables, such calculation shall be net of any credits Borrower is required to provide to BASF in connection with the BASF Receivables due to each Pre-Payment pursuant to the Supply Agreement), provided , that , the availability under this subsection (b) plus the availability under subsection (c) below shall not exceed seventy-five percent (75%) of the Borrowing Base, plus (c) (i) when a Streamline Period is not in effect, the lesser of eighty percent (80%) of Eligible Specified Accounts or One Million Dollars ($1,000,000) and (ii) during a Streamline Period, eighty percent (80%) of Eligible Specified Accounts (and with respect to subsections (c)(i) and (c)(ii) hereof, when added to the availability under subsection (b) above, in each case subject to the overall cap set forth in subsection (b) above), as determined by Bank from Borrower's most recent Borrowing Base Report (and as may subsequently be updated by Bank in Bank's sole discretion based upon information received by Bank including, without limitation, Accounts that are paid and/or billed following the date of the Borrowing Base Report); provided , however , that Bank may decrease the foregoing amounts and percentages in its good faith business judgment based on events, conditions, contingencies, or risks which, as determined by Bank, may adversely affect the Collateral.

" **LIBOR Rate Margin** " is the rate per annum set forth under the relevant column heading below:

Borrowing Base Component	LIBOR Rate Margin during a Streamline Period
Eligible Accounts	3.75%
Eligible Foreign Accounts	4.25%

" **Prime Rate Margin** " is the rate per annum set forth under the relevant column heading below:

Borrowing Base Component	Prime Rate Margin during a Streamline Period	Prime Rate Margin when a Streamline Period is not in effect
Eligible Accounts	0.75%	1.50%
Eligible Foreign Accounts	1.25%	2.00%

" **Revolving Line Maturity Date** " is April 28, 2020.

2.7 **Section 13** (**Definitions**). The following defined terms set forth in Section 13.1 is deleted in its entirety:

" **Eligible Inventory** " means Inventory that meets all of Borrower's representations and warranties in Section 5.3 and is otherwise acceptable to Bank in all respects.

2.8 **Exhibit B (Compliance Certificate)** . The Compliance Certificate attached to the Loan Agreement as Exhibit B is amended in its entirety and replaced with the Compliance Certificate in the form of Exhibit B attached hereto.

2.9 **Exhibit C (Form of Notice of Borrowing)** . The Form of Notice of Borrowing attached to the Loan Agreement as Exhibit C is amended in its entirety and replaced with the Form of Notice of Borrowing in the form of Exhibit C attached hereto.

2.10 **Exhibit E (Borrowing Base Report)** . The Borrowing Base Report attached to the Loan Agreement as Exhibit E is amended in its entirety and replaced with the Borrowing Base Report in the form of Exhibit E attached hereto.

3. **Limitation of Amendments.**

3.1 The amendments set forth in Section 2 above are effective for the purposes set forth herein and shall be limited precisely as written and shall not be deemed to (a) be a consent to any amendment, waiver or modification of any other term or condition of any Loan Document, or (b) otherwise prejudice any right or remedy which Bank may now have or may have in the future under or in connection with any Loan Document.

3.2 This Amendment shall be construed in connection with and as part of the Loan Documents and all terms, conditions, representations, warranties, covenants and agreements set forth in the Loan Documents, except as herein amended, are hereby ratified and confirmed and shall remain in full force and effect.

4. **Acknowledgement of Waiver.** Borrower and Bank acknowledge and agree that (i) the conditions set forth in the May Conditional Waiver with respect to the failure to comply with the Adjusted Quick Ratio financial covenant contained in former Section 6.9(b) of the Loan Agreement for the compliance period ending May 31, 2018 have been satisfied in full and the Resulting Default (as defined in the May Conditional Waiver) has been deemed waived by the Bank; and (ii) the conditions set forth in the August Conditional Waiver with respect to the failure to comply with each of (A) the Adjusted Quick Ratio financial covenant contained in former Section 6.9(b) of the Loan Agreement for the compliance periods ending August 31, 2018 and November 30, 2018 and (B) the EBITDA financial covenant contained in former Section 6.9(a) of the Loan Agreement for the compliance period ending December 31, 2018, in each case, have been satisfied in full and the Resulting Default (as defined in the August Conditional Waiver) has been deemed waived by the Bank. Bank hereby acknowledges the effectiveness of its deemed waivers of the defaults described above. Borrower hereby acknowledges and agrees that except as specifically provided herein or in the Conditional Waivers, nothing in this section or anywhere in this Agreement shall be deemed or otherwise construed as a waiver by Bank of any of its rights and remedies pursuant to the Loan Documents, applicable law or otherwise.

5. Representations and Warranties. To induce Bank to enter into this Amendment, Borrower hereby represents and warrants to Bank as follows:

5.1 Immediately after giving effect to this Amendment (a) the representations and warranties contained in the Loan Documents are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct as of such date), and (b) no Event of Default has occurred and is continuing;

5.2 Borrower has the power and authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement, as amended by this Amendment;

5.3 The organizational documents of Borrower delivered to Bank on the Effective Date remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect;

5.4 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, have been duly authorized;

5.5 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not and will not contravene (a) any law or regulation binding on or affecting Borrower, (b) any contractual restriction with a Person binding on Borrower, (c) any order, judgment or decree of any court or other governmental or public body or authority, or subdivision thereof, binding on Borrower, or (d) the organizational documents of Borrower;

5.6 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not require any order, consent, approval, license, authorization or validation of, or filing, recording or registration with, or exemption by any governmental or public body or authority, or subdivision thereof, binding on Borrower, except as already has been obtained or made; and

5.7 This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws of general application and equitable principles relating to or affecting creditors' rights.

6. Updated Perfection Certificate . Borrower has delivered an updated Perfection Certificate dated as of March 1, 2019 (the " **Updated Perfection Certificate** "), which Updated Perfection Certificate shall supersede in all respects that certain Perfection Certificate dated as of April 25, 2018. Borrower and Bank acknowledge and agree that all references in the Loan Agreement to the "Perfection Certificate" shall hereinafter be deemed to be a reference to the Updated Perfection Certificate.

7. No Defenses of Borrower. Borrower hereby acknowledges and agrees that Borrower has no offsets, defenses, claims, or counterclaims against Bank with respect to the Obligations, or otherwise, and that if Borrower now has, or ever did have, any offsets, defenses, claims, or counterclaims against Bank, whether known or unknown, at law or in equity, all of them are hereby expressly WAIVED and Borrower hereby RELEASES Bank from any liability thereunder.

8. Integration . This Amendment and the Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings, representations, warranties, and negotiations between the parties about the subject matter of this Amendment and the Loan Documents merge into this Amendment and the Loan Documents.

9. Counterparts. This Amendment may be executed in any number of counterparts and all of such counterparts taken together shall be deemed to constitute one and the same instrument.

10. **Fees and Expenses** . Borrower agrees to promptly pay Bank, upon receipt of an invoice, Bank's legal fees and expenses incurred in connection with this Amendment.

11. **Effectiveness** . As a condition precedent to the effectiveness of this Amendment and the Bank's obligation to make further Advances under the Revolving Line, the Bank shall have received the following documents prior to or concurrently with this Amendment, each in form and substance reasonably satisfactory to Bank:

11.1 this Amendment duly executed on behalf of Borrower;

11.2 the Acknowledgment of Amendment and Reaffirmation of Guaranty substantially in the form attached hereto as **Schedule 1** , duly executed and delivered by Guarantor;

11.3 Bank shall have received copies, certified by a duly authorized officer of Borrower, to be true and complete as of the date hereof, of each of the resolutions of Borrower authorizing the execution and delivery of this Amendment, the other documents executed in connection herewith and Borrower's performance of all of the transactions contemplated hereby;

11.4 a good standing certificate of Borrower and Guarantor, certified by the jurisdiction of incorporation of Borrower, dated as of a date no earlier than thirty (30) days prior to the date hereof;

11.5 certified copies, dated as of a recent date, of financing statement and other lien searches of Borrower and Guarantor, as Bank may request and which shall be obtained by Bank, accompanied by written evidence (including any Uniform Commercial Code termination statements) that the Liens revealed in any such searched either (i) will be terminated prior to or in connection with this Amendment, or (ii) in the sole discretion of Bank, will constitute Permitted Liens;

11.6 the Updated Perfection Certificate, duly executed by Borrower;

11.7 Borrower's payment of a fully earned, non-refundable amendment fee in the amount of Fifty Thousand Dollars ($50,000), payable in full on the date hereof; and

11.8 such other documents as Bank may reasonably request.

12. **Post-Closing Requirement** . Within thirty (30) days after the date of this Amendment, Borrower shall deliver to Bank evidence satisfactory to Bank that the insurance policies and endorsements required by Section 6.7 of the Loan Agreement are in full force and effect, together with appropriate evidence showing lender loss payable and/or additional insured clauses and cancellation notice to Bank (or endorsements reflecting same) in favor of Bank. Failure to comply with the foregoing requirement within the time period noted, or such longer period as Bank may agree in its sole discretion, shall constitute an Event of Default for which no grace or cure period shall apply.

[Signature page follows.]

In Witness Whereof, the parties hereto have caused this Amendment to be duly executed and delivered as of the date first written above.

BANK	**BORROWER**
SILICON VALLEY BANK	ASPEN AEROGELS, INC.
By: /s/ Megan Wood	By: /s/ John F. Fairbanks
Name: Megan Wood	Name: John F. Fairbanks
Title: Vice President	Title: Chief Financial Officer

Schedule 1

ACKNOWLEDGMENT OF AMENDMENT
AND REAFFIRMATION OF GUARANTY

Section 1. Guarantor hereby acknowledges and confirms that it has reviewed and approved the terms and conditions of the Ninth Amendment to Amended and Restated Loan and Security Agreement dated as of the date hereof ("the " **Amendment** ").

Section 2. Guarantor hereby consents to the Amendment and agrees that the Guaranty relating to the Obligations of Borrower under the Loan Agreement shall continue in full force and effect, shall be valid and enforceable and shall not be impaired or otherwise affected by the execution of the Amendment or any other document or instruction delivered in connection herewith.

Section 3. Guarantor represents and warrants that, after g iving effect to the Amendment, all representations and warranties contained in the Guaranty are true, accurate and complete as if made the date hereof.

Dated as of March 4, 2019.

GUARANTOR: ASPEN AEROGELS RHODE ISLAND, LLC

By: /s/ John F. Fairba nks

Name: John F. Fairbanks

Title: Chief Financial Officer

EXHIBIT B

COMPLIANCE CERTIFICATE

TO: SILICON VALLEY BANKDate:
FROM: ASPEN AEROGELS, INC.

The undersigned authorized officer of Aspen Aerogels, Inc. (" **Borrower** ") certifies that under the terms and conditions of the Amended and Restated Loan and Security Agreement between Borrower and Bank (as amended and in effect, the " **Agreement** "), (1) Borrower is in complete compliance for the period ending _______________ with all required covenants except as noted below, (2) there are no Events of Default, (3) all representations and warranties in the Agreement are true and correct in all material respects on this date except as noted below; provided , however , that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided , further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date , (4) Borrower, and each of its Subsidiaries, has timely filed all required tax returns and reports, and Borrower has timely paid all foreign, federal, state and local taxes, assessments, deposits and contributions owed by Borrower except as otherwise permitted pursuant to the terms of Section 5.9 of the Agreement, and (5) no Liens have been levied or claims made against Borrower or any of its Subsidiaries, if any, relating to unpaid employee payroll or benefits of which Borrower has not previously provided written notification to Bank. Attached are the required documents supporting the certification. The undersigned certifies that these are prepared in accordance with GAAP consistently applied from one period to the next except as explained in an accompanying letter or footnotes. The undersigned acknowledges that no borrowings may be requested at any time or date of determination that Borrower is not in compliance with any of the terms of the Agreement, and that compliance is determined not just at the date this certificate is delivered. Capitalized terms used but not otherwise defined herein shall have the meanings given them in the Agreement.

Please indicate compliance status by circling Yes/No under "Complies" column.

Reporting Covenant	Required	Complies
Monthly financial statements with Compliance Certificate	Monthly within 30 days	Yes No
Quarterly financial statements	Quarterly within 45 days	Yes No
Annual financial statement (CPA Audited) + CC	FYE within 150 days	Yes No
10-Q, 10-K and 8-K	Within 5 days after filing with SEC	Yes No
A/R & A/P Agings, and Deferred Revenue reports	Monthly within 20 days	Yes No
Borrowing Base Reports	15 th and last Business Day of each month (monthly within 20 days when a Streamline Period is in effect) and with each request for a Credit Extension;	Yes No
Projections	FYE within 30 days	Yes No
The following Intellectual Property was registered after the Effective Date (if no registrations, state "None")____		

Financial Covenant	Required	Actual	Complies
Maintain as indicated:			
Minimum EBITDA	*	$	Yes No

*See Section 6.9

Performance Pricing		Applies
Adjusted Quick Ratio at least 1.50:1.00	Prime + 0.75% (Eligible Accounts) or Prime + 1.25% (Eligible Foreign Accounts); LIBOR + 3.75% (Eligible Accounts) or LIBOR +4.25% (Eligible Foreign Accounts)	Yes No
Adjusted Quick Ratio less than 1.50:1.00	Prime + 1.50% (Eligible Accounts); Prime + 2.00% (Eligible Foreign Accounts)	Yes No

The following financial covenant analyses and information set forth in Schedule 1 attached hereto are true and accurate as of the date of this Certificate.

The following are the exceptions with respect to the certification above: (If no exceptions exist, state "No exceptions to note.")

ASPEN AEROGELS, INC.	**BANK USE ONLY**
By:	Received by: _____________________
Name:	AUTHORIZED SIGNER
Title:	Date: _________________________
	Verified: ________________________
	AUTHORIZED SIGNER
	Date: _________________________
	Compliance Status: Yes No

Schedule 1 to Compliance Certificate

Financial Covenants of Borrower

In the event of a conflict between this Schedule and the Loan Agreement, the terms of the Loan Agreement shall govern.

I. **EBITDA** (Section 6.9)

Required: Borrower shall achieve, measured as of the end of each fiscal quarter during the following periods, EBITDA of at least (loss not worse than) the following for the following periods:

Period	**Minimum EBITDA (maximum loss)**
Trailing three (3) month period ending March 31, 2019	($4,500,000)
Trailing six (6) month period ending June 30, 2019	($5,000,000)
Trailing nine (9) month period ending September 30, 2019	($5,500,000)
Trailing twelve (12) month period ending December 31, 2019	($4,500,000)

Actual:

A. Net Income

B. To the extent included in the determination of Net Income

1.The provision for income taxes

2.Depreciation expense

3.Amortization expense

4.Net Interest Expense

5.Non-cash stock compensation expense

6.The sum of lines 1 through 5

C. EBITDA (line A plus line B.6)

Is line C equal to or greater than $___________?

No, not in compliance   Yes, in compliance

EXHIBIT C

FORM OF NOTICE OF BORROWING

Date: ______________

To: Silicon Valley Bank
3003 Tasman Drive
Santa Clara, CA 95054
Attention: CFD Operations
Email: CFDOperations@svb.com

RE : Amended and Restated Loan and Security Agreement dated as of September 3, 2014 (as amended, modified, supplemented or restated from time to time, the " **Loan Agreement** "), by and among **ASPEN AEROGELS, INC.** , a Delaware corporation (" **Borrower** ") and **SILICON VALLEY BANK** (the " **Bank** ")

Ladies and Gentlemen:

The undersigned refers to the Loan Agreement, the terms defined therein and used herein as so defined, and hereby gives you notice irrevocably, pursuant to Section 3.4(a) of the Loan Agreement, of the request for an Advance.

The Funding Date, which shall be a Business Day, of the requested borrowing is _______, 201__.

The Currency of the requested borrowing is U.S. Dollars.

The aggregate amount of requested Advances is $.

The requested Advance is being requested with respect to [Eligible Accounts][Eligible Foreign Accounts].

The requested Advances shall consist of $___________ of Prime Rate Advances and $______ of LIBOR Advances.

The duration of the Interest Period for the LIBOR Advances included in the requested Advances shall be [one (1)][two (2)][three (3)] month(s).

The undersigned hereby certifies that the following statements are true on the date hereof, and will be true on the date of the proposed Credit Extension before and immediately after giving effect thereto, and to the application of the proceeds therefrom, as applicable:

(a) all representations and warranties of Borrower contained in the Loan Agreement are true, complete and correct in all material respects as of the date hereof; provided , however , that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided , further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date; and

(b) no Event of Default has occurred and is continuing, or would result from the disbursement of such proposed Credit Extension.

BORROWER:

ASPEN AEROGELS, INC.

By_________________________________
Name:______________________________
Title:______________________________

For internal Bank use only

LIBOR Pricing Date	LIBOR	LIBOR Variance	Maturity Date
		____%	

<u>EXHIBIT E</u>

BORROWING BASE REPORT

[To be provided by Bank]

Exhibit 31.1

CERTIFICATIONS UNDER SECTION 302

I, Donald R. Young, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q 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: May 2, 2019

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

Exhibit 31.2

CERTIFICATIONS UNDER SECTION 302

I, John F. Fairbanks, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q 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: May 2, 2019

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

Exhibit 32

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 Quarterly Report on Form 10-Q for the quarter ended March 31, 2019 (the "Form 10-Q") 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-Q fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: May 2, 2019	/s/ Donald R. Young
	Donald R. Young President and Chief Executive Officer (principal executive officer)
Dated: May 2, 2019	/s/ John F. Fairbanks
	John F. Fairbanks Vice President, Chief Financial Officer and Treasurer (principal financial officer and principal accounting officer)

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.