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 June 30, 2020

OR

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

For the transition period from to

Commission file number: 001-36481

ASPEN AEROGELS, INC.
(Exact name of registrant as specified in its charter)

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

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

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

Title of each class	Trading Symbol	Name of exchange on which registered
Common Stock, par value $0.00001 per share	ASPN	The New York Stock Exchange

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 ☒

As of August 4, 2020, the registrant had 26,845,309 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 — FINANCIAL INFORMATION

Item 1. Financial Statements.

ASPEN AEROGELS, INC.

Consolidated Balance Sheets

(Unaudited)

	June 30 2020	December 31, 2019
	(In thousands, except share and per share data)	
Assets		
Current assets:		
Cash and cash equivalents	$ 13,359	$ 3,633
Accounts receivable, net of allowances of $130 and $144	19,168	32,254
Inventories	9,452	8,768
Prepaid expenses and other current assets	1,391	1,114
Total current assets	43,370	45,769
Property, plant and equipment, net	50,132	53,617
Operating lease right-of-use assets	3,949	4,032
Other long-term assets	94	84
Total assets	$ 97,545	$ 103,502
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 4,713	$ 12,596
Accrued expenses	4,092	8,057
Revolving line of credit	—	3,123
Deferred revenue	3,412	5,620
Operating lease liabilities	1,091	1,038
Total current liabilities	13,308	30,434
Prepayment liability	9,676	9,786
Long-term debt	3,661	—
Operating lease liabilities long-term	4,091	4,292
Other long-term liabilities	278	—
Total liabilities	31,014	44,512
Commitments and contingencies (Note 8)		
Stockholders' equity:		
Preferred stock, $0.00001 par value; 5,000,000 shares authorized, no shares issued and outstanding at June 30, 2020 and December 31, 2019	—	—
Common stock, $0.00001 par value; 125,000,000 shares authorized, 26,845,309 and 24,302,504 shares issued and outstanding at June 30, 2020 and December 31, 2019, respectively	—	—
Additional paid-in capital	561,548	545,140
Accumulated deficit	(495,017)	(486,150)
Total stockholders' equity	66,531	58,990
Total liabilities and stockholders' equity	$ 97,545	$ 103,502

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.

Consolidated Statements of Operations

(Unaudited)

	Three Months Ended June 30, 2020	Three Months Ended June 30, 2019	Six Months Ended June 30, 2020	Six Months Ended June 30, 2019
	(In thousands, except share and per share data)			
Revenue:				
Product	$ 24,526	$ 28,908	$ 52,833	$ 55,693
Research services	115	625	227	1,752
Total revenue	24,641	29,533	53,060	57,445
Cost of revenue:				
Product	21,761	25,715	44,160	49,193
Research services	29	304	69	1,020
Gross profit	2,851	3,514	8,831	7,232
Operating expenses:				
Research and development	2,121	1,868	4,348	3,796
Sales and marketing	2,972	3,509	6,296	7,020
General and administrative	3,406	3,352	6,921	7,592
Total operating expenses	8,499	8,729	17,565	18,408
Loss from operations	(5,648)	(5,215)	(8,734)	(11,176)
Interest expense, net	(50)	(103)	(133)	(144)
Total interest expense, net	(50)	(103)	(133)	(144)
Net loss	$ (5,698)	$ (5,318)	$ (8,867)	$ (11,320)
Net loss per share:				
Basic and diluted	$ (0.21)	$ (0.22)	$ (0.34)	$ (0.47)
Weighted-average common shares outstanding:				
Basic and diluted	26,521,861	24,118,620	25,858,076	24,025,136

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, 2019	—	$ —	24,302,504	$ —	$ 545,140	$ (486,150)	$ 58,990
Net loss	—	—	—	—	—	(3,169)	(3,169)
Stock compensation expense	—	—	—	—	992	—	992
Vesting of restricted stock units	—	—	336,951	—	(1,195)	—	(1,195)
Proceeds from underwritten public offering, net of underwriting discounts and commissions of $1,093 and issuance costs of $285	—	—	1,955,000	—	14,751	—	14,751
Balance at March 31, 2020	—	—	26,594,455	—	559,688	(489,319)	70,369
Net loss	—	—	—	—	—	(5,698)	(5,698)
Stock compensation expense	—	—	—	—	1,007	—	1,007
Issuance of restricted stock	—	—	45,066	—	—	—	—
Vesting of restricted stock units	—	—	5,629	—	(16)	—	(16)
Proceeds from employee stock option exercises	—	—	200,159	—	869	—	869
Balance at June 30, 2020	—	$ —	26,845,309	$ —	$ 561,548	$ (495,017)	$ 66,531

	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
Net loss	—	—	—	—	—	(5,318)	(5,318)
Stock compensation expense	—	—	—	—	996	—	996
Issuance of restricted stock	—	—	50,328	—	—	—	—
Vesting of restricted stock units	—	—	3,129	—	(10)	—	(10)
Balance at June 30, 2019	—	$ —	24,300,264	$ —	$ 543,249	$ (482,905)	$ 60,344

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.

Consolidated Statements of Cash Flows

(Unaudited)

	Six Months Ended June 30,	
	2020	2019
	(In thousands)	
Cash flows from operating activities:		
Net loss	$ (8,867)	$ (11,320)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	5,125	5,097
Amortization of debt issuance costs	2	—
Stock-compensation expense	1,999	1,874
Reduction in the carrying amount of operating lease right-of-use assets	472	459
Changes in operating assets and liabilities:		
Accounts receivable	13,086	3,399
Inventories	(684)	(5,781)
Prepaid expenses and other assets	(287)	(281)
Accounts payable	(7,546)	(1,823)
Accrued expenses	(3,965)	332
Deferred revenue	(2,318)	6,627
Operating lease liabilities	(537)	(470)
Other liabilities	278	(56)
Net cash used in operating activities	(3,242)	(1,943)
Cash flows from investing activities:		
Capital expenditures	(1,977)	(1,302)
Net cash used in investing activities	(1,977)	(1,302)
Cash flows from financing activities:		
Proceeds from underwritten public offering, net of underwriting discounts and commissions of $1,093	15,036	—
Issuance costs from underwritten public offering	(285)	—
Proceeds from issuance of long-term debt	3,686	—
Issuance costs from long-term debt	(27)	—
Repayments of borrowings under line of credit, net	(3,123)	(1,296)
Prepayment proceeds under customer supply agreement	—	5,000
Proceeds from employee stock option exercises	869	—
Payments made for employee restricted stock tax withholdings	(1,211)	(464)
Net cash provided by financing activities	14,945	3,240
Net increase (decrease) in cash	9,726	(5)
Cash and cash equivalents at beginning of period	3,633	3,327
Cash and cash equivalents at end of period	$ 13,359	$ 3,322
Supplemental disclosures of cash flow information:		
Interest paid	$ 125	$ 198
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	$ 389	$ 294
Changes in accrued capital expenditures	$ (337)	$ (541)

See accompanying notes to unaudited consolidated financial statements.

(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 related to aerogel technology supported by funding from several agencies of the U.S. government and other institutions in the form of research contracts. The Company has decided to cease efforts to secure additional funded research contracts and to wind down existing contract research activities during 2020.

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 six months ended June 30, 2020, the Company incurred a net loss of $8.9 million and used $3.2 million of cash in operations. On February 18, 2020, the Company received net proceeds of $14.8 million upon the completion of an underwritten public offering of the Company's common stock. On May 4, 2020, Aspen Aerogels Rhode Island, LLC received loan proceeds of $3.7 million upon the execution of a promissory note pursuant to the Paycheck Protection Program (PPP) established by the Coronavirus Aid, Relief and Economic Security Act (CARES Act) and administered by the U.S. Small Business Administration (SBA) (see note 7). The Company had cash and cash equivalents of $13.4 million, long-term debt of $3.7 million and no outstanding borrowings under its revolving line of credit as of June 30, 2020 (see note 8). After giving effect to $1.3 million of outstanding letters of credit, the amount available to the Company at June 30, 2020 under the revolving line of credit was $8.9 million. The existing revolving line of credit matures on April 28, 2021.

The Company is increasing capacity at its existing manufacturing facility in East Providence, Rhode Island and developing new technologies and strategic 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 support current operating requirements, complete the planned capacity expansion and to fund its planned strategic business initiatives.

However, in the future, the Company may need to supplement its cash balance and available credit with debt financings, customer prepayments, technology licensing fees or equity financings to provide the capital necessary to complete future capacity expansions or to fund evolving strategic business opportunities.

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, 2019 (the Annual Report), filed with the U.S. Securities and Exchange Commission on March 6, 2020.

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 June 30, 2020 and the results of its operations and stockholders' equity for the three and six months ended June 30, 2020 and 2019 and the cash flows for the six month periods then ended. The Company has evaluated subsequent events through the date of this filing.

The Company's results of operations for the three and six months ended June 30, 2020 are not necessarily indicative of the results to be expected for the year ending December 31, 2020 or any other period. In addition, the Company is uncertain of the ultimate duration and severity of the COVID-19 pandemic and recent global oil market volatility, and the impact they will have on the Company's results of operations for the year ending December 31, 2020 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

The Company recognizes revenue in accordance with 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 9 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 six months ended June 30, 2020, the Company granted 165,430 restricted common stock units (RSUs) with a grant date fair value of $1.3 million and non-qualified stock options (NSOs) to purchase 617,627 shares of common stock with a grant date fair value of $2.4 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. During the six months ended June 30, 2020, the Company also granted 45,066 shares of restricted common stock with a grant date fair value of $0.3 million and NSOs to purchase 58,902 shares of common stock with a grant date fair value of $0.2 million to its non-employee directors under the 2014 Equity Plan. The restricted common stock and NSOs granted to non-employee directors vest upon the earlier of the date that is the one-year anniversary of the grant or the day prior to the Company’s annual meeting of stockholders to be held in 2021.

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
	(In thousands)			
Cost of product revenue	$ 127	$ 123	$ 446	$ 240
Research and development expenses	167	130	313	244
Sales and marketing expenses	174	164	345	293
General and administrative expenses	539	579	895	1,097
Total stock-based compensation	$ 1,007	$ 996	$ 1,999	$ 1,874

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 486,050 shares to 7,974,980 shares effective January 1, 2020.

As of June 30, 2020, 4,632,366 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 June 30, 2020, 82,405 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 June 30, 2020, the Company has either reserved in connection with statutory tax withholdings or issued a total of 2,481,744 shares under the 2014 Equity Plan. As of June 30, 2020, there were 778,465 shares of common stock available for future grant under the 2014 Equity Plan.

Net Loss per Share

The Company calculates net loss per share of common stock based on the weighted-average number of shares of common stock outstanding during each period. Potential common stock equivalents are determined using the treasury stock method. The weighted-average number of shares of common stock 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 June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
	(In thousands)			
Revenue:				
U.S.	$ 8,092	$ 14,972	$ 21,765	$ 26,224
International	16,549	14,561	31,295	31,221
Total	$ 24,641	$ 29,533	$ 53,060	$ 57,445

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 demands or new configurations and where the Company is unsure of meeting the customer’s specifications, the Company will defer the recognition of product revenue and related costs until written customer acceptance is obtained.

The Company did not record any warranty expense during the six months ended June 30, 2020 and 2019. As of June 30, 2020, the Company had satisfied all 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, 2019

The Company has not implemented any accounting standards that had a material impact on its consolidated financial statements during the six months ended June 30, 2020.

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

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, 2019 and did not enter into any contracts during the six months ended June 30, 2020 that contained a significant financing component.

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

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 includes the consideration to which the Company expects to be entitled to receive in exchange for these shipping and handling costs.

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 June 30, 2020 and December 31, 2019.

Subsea Projects

The Company manufactures and sells products that are designed for pipe-in-pipe applications in subsea 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 method. The timing of revenue recognition is assessed on a contract-by-contract basis. During the six months ended June 30, 2020 and 2019, the Company recognized revenue of $5.3 million and $12.5 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 contracts is the labor effort expended in completing the research. Typically, the only deliverable, other than the labor hours expended, is reporting research results to the customer or delivery of research grade aerogel products. 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 tables, revenue is disaggregated by primary geographical region and source of revenue:

	Three Months Ended June 30,					
	2020			2019		
	U.S.	International	Total	U.S.	International	Total
	(In thousands)					
Geographical region						
Asia	$ —	$ 13,652	$ 13,652	$ —	$ 7,786	$ 7,786
Canada	—	235	235	—	9	9
Europe	—	1,818	1,818	—	5,864	5,864
Latin America	—	844	844	—	902	902
U.S.	8,092	—	8,092	14,972	—	14,972
Total revenue	$ 8,092	$ 16,549	$ 24,641	$ 14,972	$ 14,561	$ 29,533
Source of revenue						
Product revenue	$ 7,974	$ 13,454	$ 21,428	$ 10,790	$ 10,334	$ 21,124
Subsea projects	3	3,095	3,098	3,557	4,227	7,784
Research services	115	—	115	625	—	625
Total revenue	$ 8,092	$ 16,549	$ 24,641	$ 14,972	$ 14,561	$ 29,533

	Six Months Ended June 30,					
	2020			2019		
	U.S.	International	Total	U.S.	International	Total
	(In thousands)					
Geographical region						
Asia	$ —	$ 23,756	$ 23,756	$ —	$ 14,509	$ 14,509
Canada	—	690	690	—	1,906	1,906
Europe	—	4,955	4,955	—	12,987	12,987
Latin America	—	1,894	1,894	—	1,819	1,819
U.S.	21,765	—	21,765	26,224	—	26,224
Total revenue	$ 21,765	$ 31,295	$ 53,060	$ 26,224	$ 31,221	$ 57,445
Source of revenue						
Product revenue	$ 20,427	$ 27,087	$ 47,514	$ 20,915	$ 22,299	$ 43,214
Subsea projects	1,111	4,208	5,319	3,557	8,922	12,479
Research services	227	—	227	1,752	—	1,752
Total revenue	$ 21,765	$ 31,295	$ 53,060	$ 26,224	$ 31,221	$ 57,445

Contract Balances

The following table presents changes in the Company's contract assets and contract liabilities during the six months ended June 30, 2020:

	Balance at December 31, 2019	Additions	Deductions	Balance at June 30, 2020
	(In thousands)			
Contract assets				
Subsea projects	$ 2,811	$ 5,373	$ (5,915)	$ 2,269
Research services	172	183	(205)	150
Total contract assets	$ 2,983	$ 5,556	$ (6,120)	$ 2,419
Contract liabilities				
Deferred revenue				
Product revenue	$ 4,991	$ 561	$ (2,852)	$ 2,700
Subsea projects	491	3,208	(3,150)	549
Research services	138	94	(69)	163
Prepayment liability	9,786	—	(110)	9,676
Total contract liabilities	$ 15,406	$ 3,863	$ (6,181)	$ 13,088

During the six months ended June 30, 2020, the Company recognized $3.3 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:

	June 30, 2020	December 31, 2019
	(In thousands)	
Raw materials	$ 3,941	$ 4,334
Finished goods	5,511	4,434
Total	$ 9,452	$ 8,768

(5) Property, Plant and Equipment, Net

Property, plant and equipment consist of the following:

	June 30, 2020	December 31, 2019	Useful life
	(In thousands)		
Construction in progress	$ 946	$ 1,309	—
Buildings	24,016	24,016	30 years
Machinery and equipment	124,298	122,485	3-10 years
Computer equipment and software	8,639	8,556	3 years
Total	157,899	156,366	
Accumulated depreciation	(107,767)	(102,749)	
Property, plant and equipment, net	$ 50,132	$ 53,617	

Depreciation expense was $5.1 million for both the six months ended June 30, 2020 and 2019.

(6) Accrued Expenses

Accrued expenses consist of the following:

	June 30, 2020	December 31, 2019
	(In thousands)	
Employee compensation	$ 2,440	$ 6,472
Other accrued expenses	1,652	1,585
Total	$ 4,092	$ 8,057

(7) Debt

On May 1, 2020, Aspen Aerogels Rhode Island, LLC (Borrower) executed a promissory note (Note) in favor of Northeast Bank to receive an unsecured loan in the principal amount of $3,685,800 (the PPP Loan) pursuant to the PPP established by the CARES Act, as amended by the Paycheck Protection Program Flexibility Act (Flexibility Act), and administered by the SBA. The Borrower conferred with representatives of the SBA prior to finalizing the PPP Loan. The PPP Loan was subsequently sold by Northeast Bank to a secondary market investor, The Loan Source, Inc. (PPP Investor).

The PPP Loan carries an interest rate of 1% per year and matures two years from the date of the Note. The PPP Loan indebtedness may be forgiven in whole or in part upon application by the Borrower to the PPP Investor. The PPP Investor will determine to what extent the PPP Loan is eligible for forgiveness, subject to SBA guidelines and other regulations, based on the use of loan proceeds for payroll costs, payment of interest on covered mortgage obligations, rent and utility costs over either an eight-week or 24-week period, at the Borrower’s option, following the Borrower’s receipt of the loan proceeds. Upon the Borrower’s application for forgiveness, the SBA will review the Borrower’s eligibility, use of proceeds and other certifications in connection with the application for the PPP Loan. Upon such review, the SBA may approve or deny the Borrower’s loan forgiveness application, in whole or part. As of June 30, 2020, the Borrower had not applied for forgiveness.

If the Borrower has not applied for forgiveness within ten months from the end of the 24-week period following receipt of the loan proceeds, the Borrower shall then be required make payments of principal and accrued interest in equal monthly installments over the remaining term of the loan. In addition, the Flexibility Act permits the Borrower and the PPP Investor to mutually agree to extend the term of the PPP Loan to five years from the date of the Note. The Borrower may repay the PPP Loan at any time without penalty.

The Borrower is not required to apply for forgiveness of the PPP Loan and, upon application, the Borrower may not receive forgiveness of the PPP Loan in whole or in part. In addition, the amount of potential loan forgiveness may be reduced if the Borrower fails to maintain employee and salary levels during the eight-week or 24-week period following receipt of the loan proceeds. If the Borrower applies for forgiveness, and the PPP Loan is not forgiven in whole or only forgiven in part, the Borrower shall then be required to immediately begin making payments of principal and accrued interest in equal monthly installments over the remaining term of the loan for any post-forgiveness balance outstanding.

The Note contains customary events of default relating to, among other things, payment defaults, breaches of representations and warranties, and defaults under any loan or agreement with another debtor, including the Company’s credit facility with SVB, to the extent the PPP Investor believes such default may materially affect the Borrower’s ability to repay the PPP Loan. The occurrence of an event of default, if not cured, may result in the Borrower’s repayment of the PPP Loan prior to maturity.

The Borrower is using the proceeds of the PPP Loan to support ongoing operations and to sustain staffing levels in its East Providence, Rhode Island manufacturing facility despite the unfavorable impact of the COVID-19 pandemic and volatile energy markets on its business.

Long-term debt consists of the following:

	June 30, 2020	December 31, 2019
	(In thousands)	
Long-term debt, principal	$ 3,686	$ —
Debt issuance costs, net of accumulated amortization	(25)	—
Long-term debt	$ 3,661	$ —

The schedule of required principal payments remaining on long-term debt outstanding as of June 30, 2020 is as follows:

Year	Principal Payments
	(In thousands)
2020 (excluding the six months ended June 30, 2020)	$ —
2021	1,609
2022	2,077
Total principal payments	$ 3,686

(8) 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). As of January 1, 2019, 25.3% of any amounts that the Company invoices for Spaceloft A2 sold to BASF will be credited against the outstanding balance of the 2018 prepayment. 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). As of January 1, 2020, 50.0% of any amounts that the Company invoices for the 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 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 may require that the Company repay the uncredited amount of the 2019 Prepayment to BASF in full.

As of June 30, 2020, the Company had received $10.0 million in prepayments from BASF and applied approximately $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 at both June 30, 2020 and December 31, 2019, 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 (Loan Agreement). On March 3, 2020, the Loan Agreement was amended to extend the maturity date of the revolving credit facility to April 28, 2021.

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 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 of credit facility fee of 0.5% per annum of the average unused portion of the revolving credit facility.

Under the Loan Agreement, the Company is required to comply with both non-financial and financial covenants, including a minimum Adjusted EBITDA covenant, as defined. At June 30, 2020, the Company was in compliance with all such covenants. Obligations under the Loan Agreement are secured by a security interest in all assets of the Company, including those at the East Providence facility, except for certain exclusions. The Company intends to extend or replace the facility prior to its maturity.

At June 30, 2020 and December 31, 2019, the Company had zero and $3.1 million, respectively, drawn on the revolving credit facility. In addition, 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 $1.3 million and $0.9 million at June 30, 2020 and December 31, 2019, respectively, which reduce the funds otherwise available to the Company under the facility.

At June 30, 2020, the amount available to the Company under the revolving credit facility was $8.9 million after giving effect to $1.3 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.

(9) Leases

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

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. 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 right-of-use (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. The Company calculates its incremental borrowing rate using a synthetic credit rating analysis based on Moody’s Building Materials Industry Rating Methodology. 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 does not recognize ROU assets or lease liabilities. For lease agreements with lease and non-lease components, the Company accounts for each component separately. However, in the case of equipment leases, the Company accounts for lease and non-lease components as a single component.

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 June 30, 2020 are as follows:

Year	Operating Leases
	(In thousands)
2020 (excluding the six months ended June 30, 2020)	$ 751
2021	1,331
2022	1,249
2023	1,193
2024	684
Thereafter	1,049
Total lease payments	6,257
Less imputed interest	(1,075)
Total lease liabilities	$ 5,182

The Company incurred operating lease costs of $0.7 million during both the six months ended June 30, 2020 and 2019. Cash payments related to operating lease liabilities were $0.7 million during both the six months ended June 30, 2020 and 2019.

At June 30, 2020, the weighted average remaining lease term for operating leases was 5.0 years. At June 30, 2020, the weighted average discount rate for operating leases was 7.7%.

(10) Net Loss Per Share

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
	(In thousands, except share and per share data)			
Numerator:				
Net loss	$ (5,698)	$ (5,318)	$ (8,867)	$ (11,320)
Denominator:				
Weighted average shares outstanding, basic and diluted	26,521,861	24,118,620	25,858,076	24,025,136
Net loss per share, basic and diluted	$ (0.21)	$ (0.22)	$ (0.34)	$ (0.47)

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 and Six Months Ended June 30,	
	2020	2019
Common stock options	3,954,223	3,679,254
Restricted common stock units	715,482	1,105,415
Restricted common stock awards	123,191	128,453
Total	4,792,896	4,913,122

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.

(11) 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.

(12) Subsequent Events

The Company has evaluated subsequent events through August 5, 2020, the date of issuance of the consolidated financial statements for the three and six months ended June 30, 2020.

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, 2019, filed with the U.S. Securities and Exchange Commission (SEC) on March 6, 2020, 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.

Investors and others should note that we routinely use the Investors section of our website to announce material information to investors and the marketplace. While not all of the information that we post on the Investors section of our website is of a material nature, some information could be deemed to be material. Accordingly, we encourage investors, the media, and others interested in us to review the information that we share on the Investors section of our website, https://www.aerogel.com/.

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. As we continue to enhance our aerogel technology platform, we believe we will have opportunities to address additional high value applications in the global insulation market and in a diverse set of new markets, including the electric vehicle market.

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 research services under contracts with various agencies of the U.S. government, including the Department of Defense and the Department of Energy, and other institutions. In late 2019, we decided to cease efforts to secure additional funded research contracts and to wind down our existing contract research activities during 2020. This decision reflected our desire to focus our research and development resources on initiatives to improve the profitability of our existing business and on efforts to develop new products and next generation technology with application in new, high value markets.

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 and had increased our annual capacity through 2017 to 50 million square feet of aerogel blankets. During 2018, we initiated a series of projects, which we refer to as EP20, designed to increase this capacity to 60 million square feet of aerogel blankets by the end of 2020. As of June 30, 2020, we had increased our annual capacity to 55 million square feet of aerogel blankets as a result of this initiative. We have delayed the implementation of our next generation chemistry and process technologies during 2020 and currently expect to achieve our EP20 goals by the end of 2021.

We are engaged in 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. We may repay the prepayments 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. As of 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. As of 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 may require that we repay the uncredited amount to BASF.

On February 18, 2020, we completed an underwritten public offering of 1,955,000 shares of our common stock at an offering price of $8.25 per share. We received net proceeds of $14.8 million after deducting underwriting discounts and commissions of $1.1 million and offering expenses of approximately $0.3 million.

On March 3, 2020, we amended our revolving credit facility with Silicon Valley Bank to extend the maturity date of the facility to April 28, 2021. 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 of credit facility fee of 0.5% per annum of the average unused portion of the revolving credit facility. The credit facility was also amended to establish certain minimum Adjusted EBITDA levels with respect to the minimum Adjusted EBITDA financial covenant for the extended term. We currently project that we may not meet the Adjusted EBITDA financial covenant for the quarter ending on December 31, 2020. Accordingly, we intend to enter into discussions with Silicon Valley Bank with the goal of modifying the Adjusted EBITDA financial covenant to ensure continued compliance through the maturity of the facility. We also intend to extend or replace the facility prior to its maturity.

On May 1, 2020, our wholly-owned subsidiary, Aspen Aerogels Rhode Island, LLC (Borrower), executed a note for an unsecured loan of $3,685,800 pursuant to the Paycheck Protection Program (PPP Loan) under the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), as amended, and administered by the U.S. Small Business Administration (SBA). The Borrower conferred with representatives of the SBA prior to finalizing the PPP Loan. The loan is unsecured, contains customary events of default, carries an interest rate of 1% per year, and matures on May 1, 2022. The Borrower may repay the loan at any time without penalty. In addition, the Borrower is permitted at any time to submit an application to extend the maturity of loan to May 1, 2025.

The Borrower may apply to have the PPP Loan indebtedness forgiven in whole or in part subject to SBA guidelines and based on the use of loan proceeds for payroll costs, mortgage interest payments, rent and utility costs over either an eight-week or 24-week period, at the Borrower's option, following its receipt of the loan proceeds. The SBA may disapprove of the Borrower's loan forgiveness application if the agency determines that it was ineligible for the PPP Loan. As of June 30, 2020, the Borrower had not applied for forgiveness.

The Borrower is not required to apply for PPP loan forgiveness and, upon application, it may not receive loan forgiveness in whole or in part. In addition, the amount of potential loan forgiveness will be reduced if the Borrower fails to maintain employee and salary levels during the eight-week or 24-week period following its receipt of the loan proceeds. If the Borrower applies for forgiveness, and the PPP loan is not forgiven in whole or only forgiven in part, the Borrower will be required to immediately begin making payments of principal and accrued interest in equal monthly installments over the remaining term of the loan for any post-forgiveness balance outstanding. If the Borrower does not apply for forgiveness by August 19, 2021, it will be required to make payments of principal and accrued interest in equal monthly installments over the remaining term of the loan.

The Borrower is using the proceeds of the PPP loan to support ongoing operations and to sustain staffing levels in our East Providence, Rhode Island manufacturing facility despite the unfavorable impact the COVID-19 pandemic and volatile energy markets are having on our business.

Our revenue for the six months ended June 30, 2020 was $53.1 million, which represented a decrease of $4.4 million, or 8%, from the six months ended June 30, 2019. Net loss for the six months ended June 30, 2020 was $8.9 million and net loss per share was $0.34. Net loss for the six months ended June 30, 2019 was $11.3 million and net loss per share was $0.47.

With regard to the COVID-19 pandemic, we are following and implementing safe practices recommended by public health authorities and other government entities. We will continue to focus on the safety and health of our employees, customers and vendors. We have implemented various precautionary measures, including remote work arrangements, restricted business travel and procedures for social distancing, face coverings and safe hygiene. We continue to monitor public health guidance as it evolves and plan to adapt our practices as appropriate. Refer to the section below entitled "Item 1A. Risk Factors" for more information concerning risks to our business associated with COVID-19.

At present, we are not certain of the extent of the impact that the COVID-19 pandemic and global oil market volatility may have on our business. Our manufacturing facility remains operational and we have not encountered any significant disruption to our supply chain or our ability to deliver to our customers. However, the demand for our products has been negatively impacted and we expect to experience a year-over-year decrease in total revenue.

In response to this general uncertainty in the market for our products, we have taken a number of actions to reduce expenses, including wage reductions, temporary suspension of board fees and selected reductions to discretionary expenses. In addition, as permitted by the CARES Act, we have elected to defer certain payments of our employer share of Social Security tax that would otherwise be required to be paid during the period beginning on March 27, 2020 and ending December 31, 2020. We are also prepared to temporarily curtail operations in our East Providence, Rhode Island manufacturing facility if necessary to ensure the safety of our employees or to align capacity with the expected lower demand. However, these reductions and any subsequent actions we may take may not be sufficient to offset the impact of the expected decrease in revenue and we are likely to experience a year-over-year increase in net loss and decrease in Adjusted EBITDA in 2020.

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 capacity was 55 million square feet of aerogel blankets at June 30, 2020. 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 in square feet associated with recognized revenue, including revenue recognized over time utilizing the input method, for the periods presented:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
	(In thousands)			
Product shipments in square feet	7,317	8,421	15,482	17,106

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 June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
	(In thousands)			
Net loss	$ (5,698)	$ (5,318)	$ (8,867)	$ (11,320)
Depreciation and amortization	2,562	2,565	5,125	5,097
Stock-based compensation(1)	1,007	996	1,999	1,874
Interest expense	50	103	133	144
Adjusted EBITDA	$ (2,079)	$ (1,654)	$ (1,610)	$ (4,205)

(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. Accordingly, we expect that our net income (loss), earnings per share and Adjusted EBITDA will vary from period to period.

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 the completion of required performance obligations.

At present, we are not certain of the extent of the impact that the COVID-19 pandemic and global oil market volatility may have on our business. Our manufacturing facility remains operational and we have not yet encountered any significant disruption to our supply chain or our ability to deliver to our customers. However, the demand for our products has been negatively impacted and we expect to experience a year-over-year decrease in total revenue.

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. 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. As a result of these factors, material costs as a percentage of product 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. We expect that material costs will decrease in absolute dollars during 2020 due to the expected decrease in demand for our products associated with the COVID-19 pandemic and global oil market volatility, lower cost product formulations, and improved manufacturing yields.

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 that manufacturing expense will decline in absolute dollars during 2020 principally due to our plan to reduce compensation costs and discretionary expenses in response to the expected decrease in demand for our products associated with the COVID-19 pandemic and global oil market volatility.

In total, we expect that cost of product revenue will decrease in absolute dollars during 2020, but is likely to increase as a percentage of product revenue versus 2019 due to the expected decrease in our 2020 revenue levels associated with the COVID-19 pandemic and global oil market volatility.

Cost of research services revenue consists of direct labor costs of research personnel engaged in 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. We expect cost of research services will decline as we wind down our existing contract research activities during 2020.

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 2020, the demand for our products has been negatively impacted due to the COVID-19 pandemic and global oil market volatility and we expect to experience a year-over-year decrease in total revenue. We also expect that material costs will decrease as a result of lower cost product formulations, enhanced yields and the expected decrease in demand for our products. In addition, we expect that manufacturing expenses will decline principally due to our plan to reduce compensation costs and discretionary expenses. However, we expect these material cost and manufacturing reductions will not be sufficient to offset the impact of the expected decrease in revenue and we are likely to experience a year-over-year decrease in gross profit both in absolute dollars and as a percentage of revenue during 2020.

Operating Expenses

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

We expect that operating expenses will decline in absolute dollars during 2020 principally due to our plan to reduce compensation costs and discretionary expenses in response to the general uncertainty associated with the COVID-19 pandemic and global oil market volatility. However, we expect operating expenses will increase as a percentage of revenue versus 2019 due to the expected decrease in demand for our products during 2020.

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, trial formulations for new products, 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.

We expect that research and development expenses during 2020 will remain unchanged from 2019 levels. However, we expect research and development expenses to increase a percentage of revenue versus 2019 due to the expected decrease in our revenue during 2020 as a result of the COVID-19 pandemic and global oil market volatility and due to our decision to wind down our contract research activities during 2020 to focus our research and development resources on improving our existing business profitability and developing new products and next generation technology with application in new, high value markets.

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 expect that sales and marketing expenses will decline in absolute dollars during 2020 principally due to our plan to reduce compensation costs and discretionary expenses in response to the general uncertainty associated with the COVID-19 pandemic and global oil market volatility. However, we expect sales and marketing expenses will increase as a percentage of revenue versus 2019 due to the expected decrease in demand for our products during 2020.

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 regulations, 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.

We expect that general and administrative expenses will decline in absolute dollars during 2020 principally due to our plan to reduce compensation costs and discretionary expenses in response to the general uncertainty associated with the COVID-19 pandemic and global oil market volatility. However, we expect general and administrative expenses will increase as a percentage of revenue versus 2019 due to the expected decrease in demand for our products during 2020.

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 June 30, 2020 compared to the three months ended June 30, 2019

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

Revenue

	Three Months Ended June 30,				Change	
	2020		2019			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Revenue:						
Product	$ 24,526	100%	$ 28,908	98%	$ (4,382)	(15)%
Research services	115	0%	625	2%	(510)	(82)%
Total revenue	$ 24,641	100%	$ 29,533	100%	$ (4,892)	(17)%

The following chart sets forth product shipments in square feet associated with recognized revenue, including revenue recognized over time utilizing the input method, for the periods presented:

	Three Months Ended June 30,		Change	
	2020	2019	Amount	Percentage
Product shipments in square feet (in thousands)	7,317	8,421	(1,104)	(13)%

Total revenue decreased $4.9 million, or 17%, to $24.6 million for the three months ended June 30, 2020 from $29.5 million in the comparable period in 2019. The decrease in total revenue was the result of decreases in both product revenue and research services revenue.

Product revenue decreased by $4.4 million, or 15%, to $24.5 million for the three months ended June 30, 2020 from $28.9 million in the comparable period in 2019. This decrease was principally the result of decreases in maintenance-based demand in the U.S. petrochemical and refinery markets and in project-based demand in the subsea market, offset, in part, by an increase in project-based demand in the Asian LNG market.

Product revenue for the three months ended June 30, 2020 included $5.5 million to an Asian LNG project contractor, $3.1 million to a subsea contractor and $2.4 million to a North American distributor. Product revenue for the three months ended June 30, 2019 included $6.6 million to a subsea contractor, $4.3 million to a North American distributor and $3.7 million to an Asian LNG project contractor.

The average selling price per square foot of our products decreased by $0.08, or 2%, to $3.35 per square foot for the three months ended June 30, 2020 from $3.43 per square foot for the three months ended June 30, 2019. The decrease in average selling price principally reflected the impact of the decrease in the proportion of maintenance-based product revenue in the U.S. petrochemical and refinery market for the three months ended June 30, 2020 from the comparable period in 2019. This decrease in average selling price had the effect of decreasing product revenue by $0.6 million for the three months ended June 30, 2020 from the comparable period in 2019.

In volume terms, product shipments decreased by 1.1 million square feet, or 13%, to 7.3 million square feet of aerogel products for the three months ended June 30, 2020, as compared to 8.4 million square feet for the three months ended June 30, 2019. The decrease in product volume had the effect of decreasing product revenue by $3.8 million for the three months ended June 30, 2020 from the comparable period in 2019.

Research services revenue decreased $0.5 million, or 82%, to $0.1 million for the three months ended June 30, 2020 from $0.6 million in the comparable period in 2019. The decrease was primarily due to our decision to wind down our contract research activities during 2020 to focus our research and development resources on improving our existing business profitability and developing new products and next generation technology with application in new, high value markets.

Product revenue was nearly 100% of total revenue for the three months ended June 30, 2020 and 98% of total revenue for the three months ended June 30, 2019. Research services revenue was less than 1% of total revenue for the three months ended June 30, 2020 and 2% of total revenue for the three months ended June 30, 2019.

Cost of Revenue

	Three Months Ended June 30,							
	2020			2019			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	$ 21,761	89%	88%	$ 25,715	89%	87%	$ (3,954)	(15)%
Research services	29	25%	0%	304	49%	1%	(275)	(90)%
Total cost of revenue	$ 21,790	88%	88%	$ 26,019	88%	88%	$ (4,229)	(16)%

Total cost of revenue decreased $4.2 million, or 16%, to $21.8 million for the three months ended June 30, 2020 from $26.0 million in the comparable period in 2019. The decrease in total cost of revenue was the result of decreases in both product cost of revenue and research services cost of revenue.

Product cost of revenue decreased by $3.9 million, or 15%, to $21.8 million for the three months ended June 30, 2020 from $25.7 million in the comparable period in 2019. The $3.9 million decrease was the result of a $2.2 million decrease in material costs, and a $1.7 million decrease in manufacturing expense. The decrease in material costs was the result of the 1.1 million square feet, or 13%, decrease in total product shipments, lower cost product formulations and improved manufacturing yields. The decrease in manufacturing expense was the result of decreases in compensation and related costs of $0.6 million, maintenance expense of $0.3 million, operating supplies expense of $0.3 million, waste disposal costs of $0.2 million, professional services expense of $0.2 million, and other manufacturing expenses of $0.1 million.

Product cost of revenue as a percentage of product revenue was 89% during both the three months ended June 30, 2020 and 2019.

Research services cost of revenue decreased $0.3 million, or 90%, to less than $0.1 million for the three months ended June 30, 2020 from $0.3 million for the comparable period in 2019. Cost of research service revenue as a percentage of research services revenue decreased to 25% during the three months ended June 30, 2020 from 49% in the comparable period in 2019 due to a decrease in the proportion of third-party services utilized to support the contracted research.

Gross Profit

	Three Months Ended June 30,								
	2020			2019			Change		
	Amount		Percentage of Revenue	Amount		Percentage of Revenue	Amount		Percentage
	($ in thousands)								
Gross profit	$	2,851	12%	$	3,514	12%	$	(663)	(19)%

Gross profit decreased by $0.7 million, or 19%, to $2.8 million for the three months ended June 30, 2020 from $3.5 million in the comparable period in 2019. The decrease in gross profit was the result of the $4.9 million decrease in total revenue offset, in part, by the $4.2 million decrease in total cost of revenue. The decrease in revenue was principally the result of decreases in maintenance-based demand in the U.S. petrochemical and refinery markets and in project-based demand in the subsea market, offset, in part, by an increase in project-based demand in the Asian LNG market. The decrease in total cost of revenue was the result of the 1.1 million square feet, or 13%, decrease in total product shipments, lower cost product formulations, improved manufacturing yields and a decrease in manufacturing expense.

Gross profit as a percentage of total revenue remained 12% of total revenue for the three months ended June 30, 2020 and 2019.

Research and Development Expenses

	Three Months Ended June 30,								
	2020			2019			Change		
	Amount		Percentage of Revenue	Amount		Percentage of Revenue	Amount		Percentage
	($ in thousands)								
Research and development expenses	$	2,121	9%	$	1,868	6%	$	253	14%

Research and development expenses increased by $0.2 million, or 14%, to $2.1 million for the three months ended June 30, 2020 from $1.9 million in the comparable period in 2019. The $0.2 million increase was primarily the result of an increase in compensation and related costs.

Research and development expenses as a percentage of total revenue increased to 9% for the three months ended June 30, 2020 from 6% in the comparable period in 2019 due to both the increase in research and development expenses and the decrease in revenue during the three months ended June 30, 2020.

Sales and Marketing Expenses

	Three Months Ended June 30,								
	2020			2019			Change		
	Amount		Percentage of Revenue	Amount		Percentage of Revenue	Amount		Percentage
	($ in thousands)								
Sales and marketing expenses	$	2,972	12%	$	3,509	12%	$	(537)	(15)%

Sales and marketing expenses decreased by $0.5 million, or 15%, to $3.0 million for the three months ended June 30, 2020 from $3.5 million in the comparable period in 2019. The $0.5 million decrease was the result of decreases in travel expense of $0.5 million and other marketing expenses of $0.2 million, offset, in part, by increases in compensation and related costs of $0.1 million and sales consultant expense of $0.1 million.

Sales and marketing expenses as a percentage of total revenue remained 12% of total revenue for the three months ended June 30, 2020 and 2019.

General and Administrative Expenses

	Three Months Ended June 30,				Change	
	2020		2019			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
General and administrative expenses	$ 3,406	14%	$ 3,352	11%	$ 54	2%

General and administrative expenses increased by $0.1 million, or 2%, to $3.4 million for the three months ended June 30, 2020 from $3.3 million in the comparable period in 2019. The $0.1 million increase was the result of a decrease in recoveries of provisions for uncollectible accounts receivable of $0.2 million and an increase in compensation and related costs of $0.2 million, offset, in part, by decreases in patent enforcement costs of $0.2 million and other general and administrative costs of $0.1 million.

General and administrative expenses as a percentage of total revenue increased to 14% for the three months ended June 30, 2020 from 11% in the comparable period in 2019 due to both the increase in general and administrative expenses and the decrease in revenue.

Interest Expense, net

	Three Months Ended June 30,				Change	
	2020		2019			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Interest expense, net	$ (50)	(0)%	$ (103)	(0)%	$ 53	(51)%

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 and $0.1 million during the three months ended June 30, 2020 and 2019, respectively.

Six months ended June 30, 2020 compared to the six months ended June 30, 2019

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

Revenue

	Six Months Ended June 30,				Change	
	2020		2019			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Revenue:						
Product	$ 52,833	100%	$ 55,693	97%	$ (2,860)	(5)%
Research services	227	0%	1,752	3%	(1,525)	(87)%
Total revenue	$ 53,060	100%	$ 57,445	100%	$ (4,385)	(8)%

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

	Six Months Ended June 30,		Change	
	2020	2019	Amount	Percentage
Product shipments in square feet (in thousands)	15,482	17,106	(1,624)	(9)%

Total revenue decreased $4.4 million, or 8%, to $53.1 million for the six months ended June 30, 2020 from $57.4 million in the comparable period in 2019. The decrease in total revenue was the result of decreases in both product revenue and research services revenue.

Product revenue decreased by $2.9 million, or 5%, to $52.8 million for the six months ended June 30, 2020 from $55.7 million in the comparable period in 2019. This decrease was principally the result of decreases in project-based demand in the Canadian petrochemical and refinery markets, project-based demand in the subsea market, and in maintenance-based demand in the U.S.

petrochemical and refinery markets, offset, in part, by an increase in project-based demand in the Asian LNG market and the impact of price increases enacted in 2019 and 2020.

Product revenue for the six months ended June 30, 2020 included $10.1 million to an Asian LNG project contractor and $9.4 million to a North American distributor. Product revenue for the six months ended June 30, 2019 included $10.0 million to a North American distributor and $6.8 million and $5.7 million to two subsea contractors, respectively.

The average selling price per square foot of our products increased by $0.15, or 5%, to $3.41 per square foot for the six months ended June 30, 2020 from $3.26 per square foot for the six months ended June 30, 2019. The increase in average selling price principally reflected the impact of price increases enacted in 2019 and 2020, offset, in part, by the impact of the decrease in the proportion of maintenance-based product revenue in the U.S. petrochemical and refinery market for the six months ended June 30, 2020 from the comparable period in 2019. This increase in average selling price had the effect of increasing product revenue by $2.4 million for the six months ended June 30, 2020 from the comparable period in 2019.

In volume terms, product shipments decreased by 1.6 million square feet, or 9%, to 15.5 million square feet of aerogel products for the six months ended June 30, 2020, as compared to 17.1 million square feet for the six months ended June 30, 2019. The decrease in product volume had the effect of decreasing product revenue by $5.3 million for the six months ended June 30, 2020 from the comparable period in 2019.

Research services revenue decreased $1.5 million, or 87%, to $0.2 million for the six months ended June 30, 2020 from $1.8 million in the comparable period in 2019. The decrease was primarily due to our decision to wind down our contract research activities during 2020 to focus our research and development resources on improving our existing business profitability and developing new products and next generation technology with application in new, high value markets.

Product revenue was nearly 100% of total revenue for the six months ended June 30, 2020 and 97% of total revenue for the six months ended June 30, 2019. Research services revenue was less than 1% of total revenue for the six months ended June 30, 2020 and 3% of total revenue for the six months ended June 30, 2019.

Cost of Revenue

	Six Months Ended June 30,							
	2020			2019			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	$ 44,160	84%	83%	$ 49,193	88%	86%	$ (5,033)	(10)%
Research services	69	30%	0%	1,020	58%	2%	(951)	(93)%
Total cost of revenue	$ 44,229	83%	83%	$ 50,213	87%	87%	$ (5,984)	(12)%

Total cost of revenue decreased $6.0 million, or 12%, to $44.2 million for the six months ended June 30, 2020 from $50.2 million in the comparable period in 2019. The decrease in total cost of revenue was the result of decreases in both product cost of revenue and research services cost of revenue.

Product cost of revenue decreased $5.0 million, or 10%, to $44.2 million for the six months ended June 30, 2020 from $49.2 million in the comparable period in 2019. The $5.0 million decrease was the result of a $3.8 million decrease in material costs and a $1.2 million decrease in manufacturing expense. The decrease in material costs was driven principally by the 1.6 million square feet, or 9%, decrease in product shipments, lower cost product formulations and improved manufacturing yields. The decrease in manufacturing expense was the result of decreases in operating supplies expenses of $0.4 million, waste disposal costs of $0.2 million, maintenance expense of $0.2 million, utilities expense of $0.2 million, compensation and related costs of $0.1 million, and other manufacturing expenses of $0.1 million.

Product cost of revenue as a percentage of product revenue decreased to 84% during the six months ended June 30, 2020 from 88% during the six months ended June 30, 2019. This decrease was the result of price increases enacted in 2019 and 2020, a favorable mix of products sold, lower cost product formulations, improved manufacturing yields and our initiatives to reduce manufacturing expense.

Research services cost of revenue decreased $1.0 million, or 93%, to less than $0.1 million for the six months ended June 30, 2020 from $1.0 million for the comparable period in 2019. Cost of research service revenue as a percentage of research services revenue decreased to 30% during the six months ended June 30, 2020 from 58% in the comparable period in 2019 due to a decrease in the proportion of outside services utilized to support the contracted research.

Gross Profit

	Six Months Ended June 30,				Change	
	2020		2019			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Gross profit	$ 8,831	17%	$ 7,232	13%	$ 1,599	22%

Gross profit increased $1.6 million, or 22%, to $8.8 million for the six months ended June 30, 2020 from $7.2 million in the comparable period in 2019. The increase in gross profit was the result of the $6.0 decrease in total cost of revenue, offset, in part, by the $4.4 million decrease in total revenue. The decrease in total cost of revenue was driven principally by the 1.6 million square foot, or 9%, decrease in product shipments, lower cost product formulations, improved manufacturing yields, and a decrease in manufacturing expense. The decrease in revenue was principally associated with decreases in project-based demand in the Canadian petrochemical and refinery markets, project-based demand in the subsea market, and in maintenance-based demand in the U.S. petrochemical and refinery markets, offset, in part, by an increase in project-based demand in the Asian LNG market, and the impact of price increases enacted in 2019 and 2020.

Gross profit as a percentage of total revenue increased to 17% of total revenue for the six months ended June 30, 2020 from 13% in the comparable period in 2019.

Research and Development Expenses

	Six Months Ended June 30,				Change	
	2020		2019			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Research and development expenses	$ 4,348	8%	$ 3,796	7%	$ 552	15%

Research and development expenses increased by $0.5 million, or 15%, to $4.3 million for the six months ended June 30, 2020 from $3.8 million in the comparable period in 2019. The $0.5 million increase was the result of increases in compensation and related costs of $0.4 million and other research and development expenses of $0.1 million.

Research and development expenses as a percentage of total revenue increased to 8% of for the six months ended June 30, 2020 from 7% in the comparable period in 2019 due to both the increase in research and development expenses and the decrease in revenue.

Sales and Marketing Expenses

	Six Months Ended June 30,				Change	
	2020		2019			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Sales and marketing expenses	$ 6,296	12%	$ 7,020	12%	$ (724)	(10)%

Sales and marketing expenses decreased by $0.7 million, or 10%, to $6.3 million for the six months ended June 30, 2020 from $7.0 million in the comparable period in 2019. The $0.7 million decrease was the result of decreases in travel expense of $0.6 million, compensation and related costs of $0.2 million and other marketing expenses of $0.2 million, offset, in part, by an increase in sales consultant expense of $0.3 million.

Sales and marketing expenses as a percentage of total revenue remained 12% for the six months ended June 30, 2020 and 2019.

General and Administrative Expenses

	Six Months Ended June 30,				Change	
	2020		2019			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
General and administrative expenses	$ 6,921	13%	$ 7,592	13%	$ (671)	(9)%

General and administrative expenses decreased by $0.7 million, or 9%, to $6.9 million during the six months ended June 30, 2020 from $7.6 million in the comparable period in 2019. The $0.7 million decrease was the result of decreases in patent enforcement costs of $0.4 million, compensation and related costs of $0.3 million, and other general and administrative expenses of $0.2 million, offset, in part, by a decrease in recoveries of provisions for uncollectible accounts receivable of $0.2 million.

General and administrative expenses as a percentage of total revenue remained 13% of total revenue for the six months ended June 30, 2020 and 2019.

Interest Expense, net

	Six Months Ended June 30,					
	2020		2019		Change	
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	($ in thousands)					
Interest expense, net	$ (133)	(0)%	$ (144)	(0)%	$ 11	(8)%

Interest expense, net, consists primarily of fees and interest expense associated with outstanding balances under our revolving credit agreement and was $0.1 million during both the six months ended June 30, 2020 and 2019.

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, we experienced strong growth in revenue, gross profit and cash flows from operations during 2019. Our financial projections anticipate long-term revenue growth, increasing levels of gross profit and improved cash flow from operations. To support this growth, we initiated a plan in 2018 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 have delayed the implementation of our next generation chemistry and process technologies during 2020 and currently expect to achieve our EP20 goals by the end of 2021. We may incur additional capital expenditures to complete this plan during the remainder of 2020 and 2021.

We have taken several actions to date in 2020 to increase the financial resources available to support current operating requirements, capacity expansions and strategic investments. In February 2020, we completed an underwritten public offering of our common stock and received net proceeds of $14.8 million. In March 2020, we extended the maturity of our revolving credit facility with Silicon Valley Bank to April 28, 2021. Additionally, in May 2020, our wholly-owned subsidiary, Aspen Aerogels Rhode Island, LLC, received PPP Loan proceeds of $3.7 million under the CARES Act.

We believe that our existing cash balance will be sufficient to support operations, complete the planned capacity expansion of our East Providence manufacturing facility and to fund our planned strategic business initiatives. However, we are not certain of the extent of the impact that the COVID-19 pandemic and global oil market volatility may have on our business. The demand for our products has been negatively impacted and we expect to experience a year-over-year decrease in total revenue.

In response to the expected decrease in demand for our products, we instituted a number of actions to reduce expenses and to improve liquidity during the six months ended June 30, 2020. However, these actions and any subsequent actions we may take may not be sufficient to offset the impact of the expected decrease in revenue and we are likely to experience a year-over-year increase in net loss, a decrease in Adjusted EBITDA and an increase in cash used in operating activities during 2020. In turn, we may not meet the Adjusted EBITDA financial covenant under our revolving credit agreement with Silicon Valley Bank for the quarter ending on December 31, 2020.

In response, we intend to enter into discussions with Silicon Valley Bank with the objective of modifying the Adjusted EBITDA financial covenant to ensure continued compliance through the maturity of the facility. We also intend to extend or replace the facility prior to its maturity. We may also need to supplement our cash balance with additional credit facilities, debt financings, customer prepayments, technology licensing fees or equity financings to provide the capital necessary to fund operating requirements, complete future capacity expansions or to support evolving 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 June 30, 2020, we had $13.4 million of cash and cash equivalents.

On February 18, 2020, we completed an underwritten public offering of 1,955,000 shares of our common stock at an offering price of $8.25 per share. We received net proceeds of $14.8 million after deducting underwriting discounts and commissions of $1.1 million and offering expenses of approximately $0.3 million.

On May 1, 2020, the Borrower executed a note for an unsecured loan of $3,685,800 pursuant to the PPP under the CARES Act, as amended, and administered by the SBA. The loan is unsecured, contains customary events of default, carries an interest rate of 1% per year, and matures on May 1, 2022. The Borrower may repay the loan in full at any time without penalty. In addition, the Borrower is permitted at any time to submit an application to extend the maturity of loan to May 1, 2025.

The Borrower may apply to have the PPP Loan indebtedness forgiven in whole or in part subject to SBA guidelines and based on the use of loan proceeds for payroll costs, mortgage interest payments, rent and utility costs over either an eight-week or 24-week period, at the Borrower's option, following its receipt of the loan proceeds. The SBA may disapprove of the Borrower's loan forgiveness application if the agency determines that it was ineligible for the PPP Loan. As of June 30, 2020, the Borrower had not applied for forgiveness.

The Borrower is not required to apply for PPP loan forgiveness and, upon application, it may not receive loan forgiveness in whole or in part. In addition, the amount of potential loan forgiveness will be reduced if the Borrower fails to maintain employee and certain salary levels during the eight-week or 24-week period following its receipt of the loan proceeds. If the Borrower applies for forgiveness, and the PPP loan is not forgiven in whole or only forgiven in part, it will be required to immediately begin making payments of principal and accrued interest in equal monthly installments over the remaining term of the loan for any post-forgiveness balance outstanding. If the Borrower does not apply for forgiveness by August 19, 2021, it will be required to make payments of principal and accrued interest in equal monthly installments over the remaining term of the loan.

The Borrower is using the proceeds of the PPP loan to support ongoing operations and to sustain staffing levels in our East Providence, Rhode Island manufacturing facility despite the unfavorable impact the COVID-19 pandemic and volatile energy markets are having on our business.

At June 30, 2020, we had no outstanding borrowings under our revolving credit facility with Silicon Valley Bank, $1.3 million of outstanding letters of credit secured by the revolving credit facility, $3.7 million outstanding on the PPP Loan, and an obligation of $9.9 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 3, 2020, our revolving credit facility was amended to extend the maturity date of the facility to April 28, 2021. The amendment to the credit facility also established certain minimum Adjusted EBITDA levels with respect to the minimum Adjusted 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 of credit facility fee of 0.5% per annum of the average unused portion of the revolving credit facility.

Under the revolving credit facility, we are required to comply with both non-financial and financial covenants, including the minimum Adjusted EBITDA covenant, as defined in the loan agreement. At June 30, 2020, we were in compliance with all such covenants. However, we currently project that we may not meet the Adjusted EBITDA financial covenant for the quarter ending on December 31, 2020. Accordingly, we intend to enter into discussions with Silicon Valley Bank with the goal of modifying the Adjusted EBITDA financial covenant to ensure continued compliance through the maturity of the facility. We also intend to extend or replace the facility prior to its maturity.

The amount available to us under the facility at June 30, 2020 was $8.9 million after giving effect to the $1.3 million of letters of credit outstanding.

Analysis of Cash Flow

Net Cash Used in Operating Activities

During the six months ended June 30, 2020, we used $3.2 million in net cash in operating activities, as compared to the use of $1.9 million in net cash during the comparable period in 2019, an increase in the use of cash of $1.3 million. This increase in use of cash was the result of an increase in net cash used by changes in operating assets and liabilities of $3.9 million, offset, in part, by a decrease in net loss adjusted for non-cash items of $2.6 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 six months ended June 30, 2020 and 2019 was $2.0 million and $1.3 million, respectively, in capital expenditures primarily for machinery and equipment to improve the capacity, throughput, efficiency and reliability of our East Providence facility.

Net Cash Provided by Financing Activities

Net cash provided by financing activities for the six months ended June 30, 2020 totaled $14.9 million and consisted of $19.4 million in borrowings under our line of credit, $14.8 million in net proceeds from an underwritten public offering of our common stock, $3.7 million in net proceeds from the issuance of long-term debt, and $0.9 million in proceeds from employee stock option exercises, offset, in part, by $22.6 million of repayments under our line of credit and $1.3 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 six months ended June 30, 2019 totaled $3.2 million and consisted of $56.2 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 $57.5 million of repayments under our line of credit and $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, PPP Loan Proceeds, capital requirements, and the need for additional financing to operate our business, including to complete the planned capacity expansion of our East Providence manufacturing facility, and to fund our planned strategic business initiatives; 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 expectation to achieve our EP20 goals by the end of 2021; 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; our supply agreement with BASF, our supply to BASF of its Spaceloft A2 product and newly developed product, the potential for future cash advances from BASF under our supply agreement with BASF (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; our beliefs about the expansion of our international operations; our statements about the impact of major public health concerns, including the COVID-19 pandemic or other pandemics arising globally, and the future, and currently unknown extent of, the impact of the COVID-19 pandemic on our business and operations; our statements about the sufficiency of our current and future actions to address the impact of the COVID-19 pandemic on our business and operations, including our future revenue, Adjusted EBITDA and other financial metrics; our belief that we qualify for partial or complete forgiveness of the PPP Loan; and changes by governmental authorities regarding the CARES Act or related administrative matters and the Company’s and its subsidiary’s abilities to comply with the terms of the PPP Loan and the CARES Act, including to use the proceeds of the PPP Loan as described herein.

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 June 30, 2020, we had unrestricted cash and cash equivalents of $13.4 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 June 30, 2020, we had no borrowings outstanding on our revolving credit facility. At June 30, 2020, we had $1.3 million of outstanding letters of credit supported by the revolving credit facility.

Under our revolving credit facility, we are permitted to borrow a maximum of $20.0 million, subject to continued covenant compliance and borrowing base requirements. At our election, the interest rate applicable to borrowings under the revolving credit facility may be based on the prime rate or LIBOR. Prime rate-based rates vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum, while LIBOR-based rates vary from LIBOR plus 3.75% per annum to LIBOR plus 4.25% per annum. In addition, we are required to pay a monthly unused revolving line of credit 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, 2021.

At June 30, 2020, the amount available to us under the revolving credit facility was $8.9 million after giving effect to the $1.3 million of letters of credit outstanding under the facility.

The PPP Loan executed on May 1, 2020 has an interest rate of 1% per annum. As of June 30, 2020, the PPP Loan matures in two years from the date of the note. We are permitted to submit an application to amend the loan to provide for a five-year term in accordance with the Flexibility Act. The PPP Loan has an outstanding balance of $3.7 million as of June 30, 2020.

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. Virtually 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 June 30, 2020, our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act). Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on such evaluation, our principal executive officer and principal financial officer have concluded that, as of June 30, 2020, our disclosure controls and procedures were effective to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms, and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure. In addition, our principal executive officer and principal financial officer have concluded that the impact of the COVID-19 pandemic did not impact our ability to maintain our internal controls over financial reporting and disclosure controls and procedures.

(b) *Changes in Internal Controls*.

During the six months ended June 30, 2020, 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 — OTHER INFORMATION

Item 1. Legal Proceedings.

Patent Enforcement Actions

In May 2016, we filed a complaint for patent infringement against Nano Tech Co., Ltd. (Nano), and Guangdong Alison Hi Tech., Ltd. (Alison) in the International Trade Commission, or ITC. In the ITC complaint, we alleged that these two China-based companies have engaged and are engaging in unfair trade practices by importing aerogel products in the United States that infringe, and/or are manufactured by processes that infringe, several of our patents in violation of Section 337 of the Tariff Act of 1930. In February 2018, the ITC issued its final determination confirming the Administrative Law Judge, or ALJ's, previous initial determination that Nano and Alison had infringed asserted Aspen patents and that they have not proven the patents are invalid except with respect to one dependent product claim, which the ITC found was not infringed. 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. Alison unsuccessfully appealed the ITC determination with respect to a product patent to the United States Court of Appeals for the Federal Circuit (CAFC), which affirmed the validity of our patent. The exclusion order, which is enforced by the United States Customs and Border Protection, is currently in effect.

Additionally, the United States Patent and Trademark Office, or USPTO, denied Alison's requests to invalidate the claims of four of our patents in Inter-Partes Review. Alison also filed multiple similar requests with the Chinese Patent Office, or SIPO, seeking to invalidate our Chinese manufacturing process patents and two of our Chinese product patents. With respect to one of those requests, not withdrawn previously by Alison, the Patent Reexamination Board of SIPO (PRB), issued a decision upholding the validity of Aspen's issued patent as amended in the proceedings. Alison has appealed the PRB's decision to the Beijing IP court. After the oral hearing at the Beijing IP court, we are awaiting the decision by the court. Nano has also filed a request seeking invalidation of a product patent at PRB of SIPO on which the oral hearing took place in July 2019. After the oral hearing, Nano withdrew its invalidation request. On September 23, 2019, Alison filed another request to invalidate the same patent, whose prior validity opinion by PRB is currently on appeal at the Beijing IP Court. After conducting an oral hearing, PRB issued a decision on January 23, 2020 denying Alison's latest invalidation request of this patent.

In April 2016, we also filed a patent infringement suit at the District Court in Mannheim, Germany (Mannheim court), against Nano, Alison and two European resellers asserting their infringement of one of our German patents. We subsequently asserted infringement of another three patents against Nano, Alison 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. Key events in connection with our patent enforcement in Europe are summarized below:

- 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 nullity actions in German Federal Patent Court in Munich against our asserted German patents.
- Nano and Alison also filed an opposition to one of the asserted patents at the European Patent Office (EPO). In December 2018, the opposition division of EPO determined the patent, EP2813338 (338 Patent), was invalid on formality grounds and decided to revoke it, which determination is currently under appeal at the EPO Board of appeals. On March 19 and 20, 2019 the German Federal Patent Court in Munich (FPC) conducted oral proceedings and voided four claims in EP2415577 (577 Patent) and confirmed the validity of challenged claims in EP2422950 (950 Patent) within the scope of silica gels. These FPC judgments are now final and binding on the parties. Nano has filed another nullity action seeking to invalidate the remaining claims in the 577 Patent which was subsequently terminated due to Nano's failure to provide legally required security for costs. On June 17, 2020, Nano also filed an opposition to a recently issued Aspen Patent EP16184354, titled "Continuous Sheet of Gel Materials and Continuous sheet of Aerogel".
- On March 8, 2019, the 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 EP1638750 (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 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 have appealed the judgments of the Mannheim court. The appeal is currently ongoing. The Federal Patent Court in Munich previously dismissed the challenge to the validity of 750 Patent which has become final.

- The Mannheim court issued two decisions on December 23, 2019 finding that Alison infringed the 577 Patent and the 950 Patent and also issued injunctions prohibiting Alison from continuing infringement in connection with any aerogel sheets. The December 2019 decisions against Alison have now become final and binding.
- The Mannheim court issued two decisions on July 31, 2020 finding that Nano infringed each of the 577 Patent and the 950 Patent. In addition to granting other remedies, the court also issued injunctions prohibiting the offer, putting on the market, using, importing or possessing any aerogel sheets. These decisions are subject to an appeal to the Higher Regional Court in Karlsruhe within a month of their respective service to the parties.

Additionally, a reseller of Nano's products in Taiwan challenged the validity of one of our patents in Taiwan in 2018. After careful review of our written response, the Taiwanese patent office has determined the patent as valid and dismissed the challenge in December 2018. In 2018, LG Chem Ltd. challenged the validity of one of our patents in Korea at the Intellectual Property Trial and Appeals Board (IPTAB) of the Korean Intellectual Property Office. After conducting an oral hearing, the IPTAB issued a decision on November 30, 2019 upholding claims related to aerogel sheets incorporating fibers and invalidating claims for aerogel sheets not incorporating fibers. The IPTAB decision is currently on appeal at the Korean Patent Court.

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 counter-parties in these proceedings 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 a 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. 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. Subsequent to this ruling, we recovered $0.3 million through these court actions. Additional recovery of unpaid amounts is unlikely due to Qualiman's filing of judicial reorganization under Brazilian laws and its consequences on our recovery action.

Item 1A. Risk Factors.

Other than the risk factor(s) provided below, there have been no material changes in our risk factors from those disclosed in Part I, Item 1A, "Risk Factors," in our Annual Report.

Our business, results of operations and financial condition could be materially adversely affected by the effects of widespread public health epidemics, including coronavirus and the resulting COVID-19 pandemic, that are beyond our control.

Any outbreaks of contagious diseases, public health epidemics and other adverse public health developments in countries where we, our customers and suppliers operate could have a material and adverse effect on our business, results of operations and financial condition. The recent novel strain of the coronavirus, initially limited to a region in China and now affecting the global community, including the United States, is expected to impact our operations, and the nature and extent of the impact may be highly uncertain and beyond our control. In particular, our sales globally, including to customers in the energy infrastructure and building materials markets that are impacted by the COVID-19 pandemic, could be negatively impacted as a result of disruption in demand, which could have a material adverse effect on our business, results of operations and financial condition. The COVID-19 pandemic has led to unprecedented drops in the demand for oil, which compounded with an increase or announced increase in output of oil by certain oil exporting countries has resulted in significant volatility in the price of oil, which may severely impact the demand for our products used in energy infrastructure facilities. In response to this general uncertainty in the market for our products, we have taken a number of actions to reduce expenses, including wage reductions, temporary suspension of board fees and selected reductions to discretionary expenses. In addition, as permitted by the CARES Act, we have elected to defer certain payments of our employer share of Social Security tax that would otherwise be required to be paid during the period beginning on March 27, 2020 and ending December 31, 2020. The CARES Act allows employers to deposit 50 percent of the deferred taxes on or before December 31, 2021, and the remaining 50 percent by December 31, 2022. We may also temporarily curtail operations in our East Providence, Rhode Island manufacturing facility if necessary to ensure the safety of our employees or to align capacity with demand. However, such actions or any future actions we take may not be sufficient to offset the effects of potential reduction in sales as a result of any disruption in demand. Furthermore, suppliers of our raw materials may not be able to supply the materials that we require to manufacture our products according to our schedules and specifications. If our suppliers' operations are impacted, we may need to seek alternate suppliers, which may be more expensive, may not be possible or may result in delays, each of which would affect the results of our operations. The duration of such a disruption, and related financial impact to us, cannot be accurately estimated at this time.

Uncertain factors relating to the COVID-19 pandemic include the duration of the outbreak, the severity of the disease, and the actions, or perception of actions that may be taken, to contain or treat its impact, including declarations of states of emergency, business closures, manufacturing restrictions and a prolonged period of travel, commercial and/or other similar restrictions and limitations. While the potential economic impact brought by and the duration of the coronavirus outbreak may be difficult to assess or predict, a widespread pandemic could result in significant or sustained disruption of global financial markets, reducing our ability to access capital, which could in the future negatively affect our liquidity. In addition, while we believe we have taken appropriate steps to maintain a safe workplace to protect our employees from contracting and spreading the coronavirus, including following the guidance set out from both the Occupational Safety and Health Administration and Centers for Disease Control and Prevention, we may not be able to prevent the spread of the virus among our employees, face litigation or other proceedings making claims related to unsafe working conditions, inadequate protection of our employees or other claims. Any of these claims, even if without merit, could result in costly litigation or divert management's attention and resources. Furthermore, we may face a sustained disruption to our operations due to one or more of the factors described above.

Our wholly-owned subsidiary, Aspen Aerogels Rhode Island, LLC, or the Borrower, applied for and received a loan under the Paycheck Protection Program of the CARES Act, or the PPP, pursuant to which there is no guarantee that a loan may be forgiven and we may be subjected to challenges, reviews, and investigations regarding qualification or certifications made in the application for the loan. In addition, the Borrower may be subject to audit in connection with the loan and should the Borrower request that the loan be forgiven, the United States Small Business Administration, or SBA, will conduct a full audit in connection with the loan. If there is any adverse finding from the audit or if Borrower is subject to any other investigation or challenge in connection with the loan, the Borrower could be required to return the full amount of the PPP loan plus interest, which could reduce our liquidity, and could be subject to significant fines, damages and penalties and its business could otherwise be adversely affected, whether or not there is an adverse finding. As the Borrower's parent, such events could have a material adverse effect on our business, financial condition and results of operations.

On May 1, 2020, the Borrower entered into a promissory note, or the PPP Loan Documents, to receive a loan, or the loan, pursuant to the PPP established under the CARES Act in the aggregate amount of approximately $3.7 million, or the Loan Proceeds. Under the terms of the CARES Act, recipients of PPP loans from SBA, or PPP Loans, can elect to apply for forgiveness for all or a portion of a PPP Loan after eight weeks or 24 weeks. Such forgiveness will be determined, subject to limitations, based on the use of loan proceeds during a specified eight-week period for payroll costs and mortgage interest, for rent or utility costs and for the maintenance of employee staffing and compensation levels, although no more than 25% of the amount forgiven can be attributable to non-payroll costs. No assurance is provided that the Borrower will elect to pursue forgiveness of all or a portion of the loan or be eligible for and obtain forgiveness of all or a portion of the loan. If the Borrower elects not to pursue or is unable to qualify for or obtain forgiveness of all or a portion of the loan, our liquidity could be reduced and our business, financial condition and results of operations may be adversely affected. Pursuant to the requirements under the CARES Act, in connection with the loan, the Borrower certified that current economic uncertainty makes the loan request necessary to support the ongoing operations of the Borrower. We believe that the Borrower made such certification in a manner consistent with SBA guidance that borrowers must make the certification in good faith, taking into account their current business activity and their ability to access other sources of liquidity sufficient to support their ongoing operations in a manner that is not significantly detrimental to the business. While we believe the Borrower's prior and future certifications were and will be well supported on the dates certified, in light of the understandings of the requirements and the assessment made on the certification date, we cannot be certain that SBA or any other governmental entity or third party will concur with the Borrower, especially in light of the press scrutiny and SBA's evolving guidance and views and the eventual extent of the impact of current economic uncertainties on Borrower's operations. Further, although the Borrower conferred with representatives of SBA prior to finalizing the loan, we cannot be certain that as subsidiary of a public company, the Borrower might not be deemed to have improperly made the required certifications, including that current economic uncertainty makes the loan request necessary to support the ongoing operations of the Borrower, taking into account the Borrower's current business activity and ability to access other sources of liquidity sufficient to support its ongoing operations in a manner that is not significantly detrimental to the business.

Subsequent to the Borrower's application for the loan, SBA issued various interpretive guidelines in connection with the PPP, including guidance on how SBA interprets certain of the certification requirements. One of the interpretations appears to be in response to various press reports that well established or well capitalized private and public companies were able to secure PPP loans that were meant for smaller companies. SBA's interpretive guidelines published on April 23, 2020 set forth that public companies with substantial market value and access to capital markets would qualify to participate in the PPP and SBA advised any such public company to be prepared to provide the basis for the certifications upon SBA request. Subsequently, on April 28, 2020 the Secretary of the Treasury and Small Business Administrator announced that the government will conduct a full audit of all PPP loans of more than $2 million for which the borrower applies for forgiveness. As the Borrower expects it will be audited or reviewed by SBA or the U.S. Department of the Treasury if it files an application for forgiveness, and, whether or not it elects to seek forgiveness of all or part of the loan, it could be subject to investigation, audit or other review by governmental agencies or claims by third parties, with respect to whether it qualified for an PPP Loan, or whether the certifications it made to obtain the loan are accurate, or other matters. There is a risk that any such audit, review, investigation or claim could result in the diversion of ours management's time and attention, in the need to incur significant legal expenses and in the possibility that we will sustain reputational injuries. If the Borrower were to be audited, investigated, reviewed or subject to suit and if there is any adverse finding in such audit, investigation, review or suit or if the Borrower were alleged, or determined, not to qualify for the loan or alleged, or found, to have made false certifications in connection with the loan, the Borrower could be required to return the full amount of the PPP loan, which would reduce our liquidity, and would subject it to fines and penalties, and exclusion from government contracts. In particular, the Borrower may become subject to actions under the federal False Claims Act, or the FCA, including its qui tam provisions, which, among other things, prohibits persons from knowingly filing, or knowingly causing to be filed, a false statement, or knowingly using a false statement, to obtain payment from the federal government. Violations of the FCA are subject to treble damages and penalties. In the case of a PPP Loan, the government could allege that single damages are the amount of the loan and interest thereon (or more), which under the FCA could then be trebled. Substantial penalties must also be imposed for each submitted false statement when a defendant loses a FCA trial. FCA cases may be initiated by the U.S. Department of Justice or by private persons or entities, often called "whistleblowers," who bring the action on behalf of the United States. The Borrower may also face enforcement arising under other federal statutes, including criminal laws, and administrative actions and investigations initiated by SBA or other governmental entities. Furthermore, if the Borrower is identified as an entity that the media, government officials or others seek to portray it as a business that should not have availed itself of PPP funding, the Borrower may face negative publicity, which could have a materially adverse impact on its business and operations and on our business and operations as its parent.

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 June 30, 2020.

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not applicable.

Item 5. Other Information.

None.

Item 6. Exhibits.

(a) Exhibits

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.INS	XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
104	Cover Page Interactive Data File (embedded within the Inline XBRL document).

SIGNATURES

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: August 5, 2020	By: /s/ Donald R. Young Donald R. Young President and Chief Executive Officer (principal executive officer)
Date: August 5, 2020	By: /s/ John F. Fairbanks John F. Fairbanks Vice President, Chief Financial Officer and Treasurer (principal financial officer and principal accounting officer)

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: August 5, 2020

/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: August 5, 2020

/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 June 30, 2020 (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: August 5, 2020	/s/ Donald R. Young Donald R. Young President and Chief Executive Officer (principal executive officer)
Dated: August 5, 2020	/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.