

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

Washington, D. C. 20549

POST-EFFECTIVE AMENDMENT NO. 1 TO

FORM S-3

**REGISTRATION STATEMENT NO. 333-134920
Under the Securities Act of 1933**

AXCELIS TECHNOLOGIES, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other
jurisdiction of incorporation)

34-1818596
(IRS Employer
Identification No.)

**108 Cherry Hill Drive
Beverly, Massachusetts 01915
(978) 787-4000**

(Address, Including Zip Code, and Telephone Number, Including Area Code, of Registrant's Principal Executive Offices)

**Lynnette C. Fallon
Executive Vice President and General Counsel
Axcelis Technologies, Inc.
108 Cherry Hill Drive
Beverly, Massachusetts 01915
(978) 787-4000**

(Name, Address, Including Zip Code, and Telephone Number, Including Area Code, of Agent for Service)

**with copies to:
Matthew C. Dallett
Edwards Angell Palmer & Dodge LLP
111 Huntington Avenue
Boston, MA 02199-7613
(617) 239-0100**

Approximate date of commencement of proposed sale to the public: This post-effective amendment deregisters those securities that remain unsold hereunder as of the effective date hereof.

If the only securities being registered on this form are being offered pursuant to dividend or interest reinvestment plans, please check the following box:

If any of the securities being registered on this form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box:

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering:

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering:

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box:

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box:

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

Large accelerated filer Accelerated filer Non accelerated filer Smaller reporting company
(Do not check if a smaller reporting company)

This post-effective amendment relates to Registration Statement No. 333-134920 on Form S-3 (the "Registration Statement") of Axcelis Technologies, Inc. (the "Company"), registering 4,167,188 shares of common stock, par value \$0.001 per share of the Company, which was filed with the Securities and Exchange Commission on June 9, 2006.

The offering pursuant to the Registration Statement has been terminated. In accordance with the undertaking made by the Company in the Registration Statement to remove from registration, by means of a post-effective amendment, any of the securities that remain unsold at the termination of the offering, the Company hereby removes from registration the securities of the Company registered but unsold under the Registration Statement.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933 and Rule 478 thereunder, Axcelis Technologies, Inc. has duly caused this post-effective amendment to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Beverly, Commonwealth of Massachusetts, on April 6, 2009.

AXCELIS TECHNOLOGIES, INC.

By: /s/ Mary G. Puma

Name: Mary G. Puma

Title: Chairman of the Board, President and Chief Executive Officer
(Duly authorized officer)