



Illinois Wesleyan University
Digital Commons @ IWU

John Wesley Powell Student Research
Conference

1998, 9th Annual JWP Conference

Apr 18th, 1:30 PM - 2:30 PM

Anisotropic Etching of SrTiO_3

Thomas Davidsmeier
Illinois Wesleyan University

William Murphy
Illinois Wesleyan University

Delara Godrej
Illinois Wesleyan University

Gabriel Spalding, Faculty Advisor
Illinois Wesleyan University

Follow this and additional works at: <https://digitalcommons.iwu.edu/jwprc>

Davidsmeier, Thomas; Murphy, William; Godrej, Delara; and Spalding, Faculty Advisor, Gabriel, "Anisotropic Etching of SrTiO_3 " (1998). *John Wesley Powell Student Research Conference*. 5.

<https://digitalcommons.iwu.edu/jwprc/1998/posters2/5>

This Event is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact digitalcommons@iwu.edu.

©Copyright is owned by the author of this document.

Poster Presentation 23

ANISOTROPIC ETCHING OF SrTiO_3

Thomas Davidsmeier, William Murphy, Delara Godrej, and Gabriel Spalding*
Department of Physics, Illinois Wesleyan University

The anisotropic etching properties of silicon seem to gain ever more technological importance as we enter the age of microelectromechanical devices, but the anisotropic etching of more highly polarizable materials such as SrTiO_3 has been relatively unstudied. We have reproducibly observed pyramidal pitting of single crystal SrTiO_3 surfaces, which is indicative of anisotropy in the etch rates. For a variety of etch conditions (concentration, time of etch, initial crystallographic orientation of the sample surface), we measure the depth from unetched areas down to the bottoms of etch pits on SrTiO_3 single crystals. By comparing these etch rates, along with the temporal evolution of the angles of the etch pit walls, we extract a measure of the anisotropy of etching. We present what we have learned of the kinetic bottlenecks in the etch process within a context supplied by our own theoretical calculations of lattice potentials for a variety of possible surface angles and surface terminations.