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**Discerning the Piezoelectric Quality of CdS Crystals and ZnO Films From Their Etch Properties** FRED HICKERNELL, University of Arizona, THOMAS HICKERNELL, Tempe Preparatory Academy — Several tests have been used over the years to determine the quality of piezoelectric crystals and films. A test which has been found especially useful is chemical etching. Chemical etching, while destructive to a portion of the crystal or film, reveals considerable information which can be related to its piezoelectric quality. The characteristics of the etching of CdS and ZnO crystals or films is highly anisotropic depending upon whether the acid attacks the c-axis metal face or sulfide-oxide face, or lateral to the c-axis. The etch pit density per unit area is a useful parameter for both crystals and films and can be used for comparison purposes with piezoelectric related properties. For example by controlling the percentage of the acid etchant in water, direct comparisons can be made of film properties under different deposition conditions. Etch times for ZnO films extend as low as 200 Angstroms per second for high piezoelectric coupling factor films with dense uniform fiber grains and as high as 1000 Angstroms per second for nonuniform grain structures. This paper will present the results of etching studies on (1) crystalline CdS and (2) thin-film ZnO under sputter deposition.

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