

Abstract Submitted
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Electrical Properties of Tetragonal-PZT Thin Film Capacitors from 5 K to 300 K. D.R. DAUGHTON, Lake Shore Cryotronics, J.T. EVANS, S.P. CHAPMAN, Radiant Technologies, Inc — Rapid assessment of ferroelectric device characteristics is critical to improving ferroelectric materials processing as well as developing accurate ferroelectric device models. Here, we demonstrate automated electrical testing of thin PZT and Nb-doped PZT thin film devices at temperatures ranging from 300 K down to 5 K in a cryogenic probing environment. In this configuration, temperature-dependent dielectric constant, remanent polarization, coercive voltage, switching speed, and leakage are measured in a single pass on a single sample. From these measurements, it appears that tetragonal PZT does not have a phase boundary from room temperature down to 5 K. Retention tests conducted on several capacitors while transitioning from room temperature to 200 K, 100 K, and 6.5 K showed no loss of remanent polarization indicating 20/80 PZT and its niobium-doped cousins remain fully functional as memory devices down to 5 K.

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