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Initial Temperature Effects on the Dielectric Properties of PZT 95/5 During Shock Compression[1] ROBERT SETCHELL, STEPHEN MONTGOMERY, DAVID COX, MARK ANDERSON, Sandia National Laboratories —
A strong electric field is generated when the shock-induced depoling current from a normally poled PZT 95/5 sample is passed through a large resistive load. The portion of total depoling current that is retained on the sample electrodes to account for capacitance is governed by the dynamic dielectric properties of both unshocked and shocked PZT 95/5. Early studies used measured load currents from single samples to assess models for dielectric response. More recent studies used shock-driven circuits in which multiple PZT 95/5 elements were displaced both parallel and perpendicular to the shock motion. This allowed both load and charging currents to be measured for individual elements that are subjected to shock compression and release at different times. In the present study, these techniques have been utilized to examine dielectric properties in PZT 95/5 samples at initial temperatures from -50 to 70 $^{\circ}$C. Measured currents show large temperature effects on dielectric properties, and different models for dielectric response have been examined for simulating these results.

[1]Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration.

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