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High-Energy Density Capacitors using Nanoparticle-Polymer Composite Dielelectrics KRISTIN KRAEMER, Department of Physics and Astronomy and Nebraska Center for Materials and Nanoscience, University of Nebraska-Lincoln, USA, JIANGYU LI, LEI ZHANG, Department of Mechanical Engineering, University of Washington, USA, D.J. SELLMYER, X. WEI, STEPHEN DUCHARME, Department of Physics and Astronomy and Nebraska Center for Materials and Nanoscience, University of Nebraska-Lincoln, USA — By combining a polymer with a high dielectric strength and nanoparticles with an even higher dielectric constant, we can to explore exchange coupling between the two materials that will result in a material with an optimized dielectric constant and dielectric strength. [J. Li, *Phys. Rev. Lett.* **90**, 217601 (2003)] We report the results of dielectric characterization of composites consisting of barium titanate and other dielectric nanoparticles embedded in a matrix of copolymers of vinylidene fluoride with trifluoroethylene. Basic measurements are made by creating parallel plate capacitors with aluminum electrodes on glass substrates. Capacitors made by solvent spin coating contain 0% to 50% nanoparticles by weight and have thickness of approximately 100 nm. Dielectric studies examine the relationship between capacitance and electric field, capacitance and temperature, and the pyroelectric response. This work is supported by the Office of Naval Research and the Nebraska Research Initiative.

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