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Nanoconfined Ferroelectric Polymers as High Energy Density and Low Loss Dielectrics[1]

LEI ZHU, Case Western Reserve University

Although a high electric energy density was recently reported for defect-modified poly(vinylidene fluoride) (PVDF) copolymers at millisecond discharge, they usually deliver less energy due to the ferroelectric property. In this presentation, a low loss polystyrene (PS) was grafted as side chains onto the P(VDF-CTFE) main chain. After PVDF crystallization, dielectric PS side chains were segregated to the crystalline-amorphous interface, forming a finite confinement layer for ferroelectric PVDF crystals. We speculated that less space charge was induced during electric poling because of the nanoscale confinement effect. Consequently, a fast discharge speed, relatively high energy density, and low losses were achieved.

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