Materials Day

Abstract Guide

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Dielectric polymers exhibit high energy density and giant cross-coupling effects

W. Zhu, G. Rui, and Q.M. Zhang

Abstract: Dielectric polymers are of interest in energy storage, conversion, and harvesting. Over several decades, efforts have been made to enhance the energy density and cross-coupling factors (for example, electrical-thermal, E-T, and electrical-mechanical, E-M, conversion couplings) to substitute toxic and brattle ceramics. We here present some of our recent advances in novel polymer dielectrics. For energy storage, we developed strategies to enhance the dielectric constant (K~12) while maintaining the dielectric loss and breakdown strength, which are in favor of the application of film capacitors. To enhance E-T and E-M coupling, we synthesized a series of novel fluoropolymers with excellent piezoelectric, electrostrictive, and electrocaloric performance, which pave the way for the muti-functional, self-actuated cooling devices. These works offer great insights For developing more new polymer dielectrics with different functions.