Contribution ID: **154** Type: **Poster**

Ferroelectric properties and breakdown strength of layer-by-layer poly(vinylidene fluoride-co-hexafluoropropylene) (P(VDF-HFP)) and polyurethane (PU) for energy storage application

Ferroelectric polymers are one of the next-generation pulsed capacitor materials for the potential application in capacitive energy storage. This polymer with higher saturated polarization, smaller remnant polarization and higher electrical breakdown are the most promising candidates. In this work, the dielectric properties and energy storage capacity of the bilayer polymers films of Poly(vinylidene fluoride-co-hexafluoropropylene) (P(VDF-HFP)) and polyurethane (PU) were studied. These bilayer polymers were prepared by layer-by-layer method at the condition of variable layer thickness. The results show that the dielectric constants and the saturated polarization of the bilayer films increased, and bilayer films with P70/PU30 exhibit electrical high breakdown strength (Eb) up to 379 V/μm. Moreover, enhanced the energy density (Ue) and the energy storage efficiency of the bilayer constrictors will be discussed for the capacitive energy storage polymers.

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Track Classification: Energy Materials and Physics