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Dielectric Characterization of Poly(styrene-b-methyl methacrylate) Block Copolymer Films[1] CHRISTOPHER GRABOWSKI, MICHAEL DURSTOCK, RICHARD VAIA, Air Force Research Laboratory, Wright Patterson Air Force Base — Polymer films that incorporate nanoscale features have been previously investigated for their suitability as dielectric insulating materials, such as mixtures of high dielectric strength polymers with high permittivity nanoparticles. Block copolymers, due to their highly customizable molecular-scale morphologies, may exhibit useful energy storage properties. Spherical, cylindrical, or lamellar morphologies can all be generated by altering block size ratio. We report the dielectric study of thin, substrate supported poly(styrene-b-methyl methacrylate) linear block copolymer films. Energy storage capabilities will be determined through dielectric strength and permittivity measurements. As both polymer blocks have similar permittivity, field enhancement effects that typically occur in inorganic nanoparticle/polymer composites are limited. Our experiments with block copolymers will more directly test how dielectric breakdown is influenced by interfacial interactions.

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