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Block Copolymer Nanocomposites for RF Magneto-dielectric Applications TA-I YANG, PETER KOFINAS, Department of Chemical and Biomolecular Engineering, University of Maryland, College Park, MD — The aim of this research is to develop novel block copolymer nanocomposites for radio frequency applications. Block copolymers (BCP) act as templates to enhance the ordering of nanoparticles within the polymer matrix and tailor the desired electromagnetic properties such as permeability (μ) and permittivity (ε). We incorporated iron and strontium or titanium organometallic precursors into three different polymer matrices (styrene-*b*-isoprene-*b*-styrene (SIS), styrene-b-(ethylene-ran-butylene)-b-styrene (SEBS), and sulfonated styrene-b-(ethylene-ran-butylene)-b-styrene (S-SEBS)) and then formed mixed metal oxide nanoparticles within the BCP. Preliminary experimental results demonstrated we can obtain $\mu = \varepsilon$ near 2.7 with low loss tangent ($\tan \delta$ $<$0.01) through the 1 M to 1G Hz frequency range by utilizing SIS or SEBS with templated Fe_20_3/SrO nanoparticles. For the S-SEBS copolymer composites, most mixed metal oxide nanoparticles were successfully templated into BCP self-assembled patterns confirmed by TEM, and the loss tangent could be significantly reduced by heat treatment.

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