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**Magnetic Polymer Nanocomposites with Tunable Microwave Properties** K. STOJAK, S. PAL, H. SRIKANTH, University of South Florida-Physics, S. SKIDMORE, C. MORALES, J. DEWDNEY, J. WANG, T. WELLER, University of South Florida-Electrical Engineering — Due to the multifunctionality, polymer nanocomposites (PNCs) have potential applications for electromagnetic interference shielding, tunable electromagnetic devices and flexible electronics. We report on synthesis, magnetic and RF characterization of polymer films loaded with varying concentrations of  $\text{Fe}_3\text{O}_4$  and  $\text{CoFe}_2\text{O}_4$  nanoparticles. The nanoparticles ( $5 \pm 1$  nm) were synthesized by chemical co-precipitation. Structural properties were characterized by XRD and TEM. Nanoparticles were dispersed through a solution method in a low-loss microwave polymer from the Rogers Corporation. No aggregation was observed and particles remain well dispersed throughout the volume of the polymer matrix. Magnetic measurements using a Physical Property Measurement System revealed characteristic features of superparamagnetism at room temperature and blocking at low temperature. Microwave transmission/reflection studies on the PNCs were done using a microstrip resonator technique, and strong tunability in the microwave absorption was observed.

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