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Effect of Magnetic-Dielectric Interface on Capacitor Functions of Fe-Doped Barium Titanate Nanocomposites at Low Frequency ($<$ 1 MHz) ATAUR CHOWDHURY, University of Alaska Fairbanks, KAPIL KULKARNI, NanoLab, Inc., Newton, MA, GAUTAM SARKAR, US Department of Defense — Metal-dielectric interfaces have been shown to greatly influence the capacitor functions of nanodielectric composites. However, the effect of magnetic metal impurities in nanocomposites on dielectric properties is not well understood. Nanodielectric composites of iron in off stoichiometric barium titanate were fabricated by sol-gel process with varying pH concentrations. The fabricated samples containing 1-2% iron reveal unique interfacial structure as studied by X-ray and atomic force microscopy. The capacitance of the as prepared samples was measured with an Agilent LCR meter at frequencies ranging from 20 Hz to 1 MHz. All nanodielectric composites show similar capacitor characteristic and reveal continuous decrease in capacitor density with increasing frequency. For a particular sample, this continuous decrease is a direct result of the porous interface between the iron granules and the dielectric material. This behavior, however, is not measurably influenced by an applied magnetic field in all samples.

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