Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effect of Metal-Dielectric Interface on Capacitor Functions of Ag-Polymer Nanocomposites at Low Frequency (< 1 MHz) ATAUR CHOWDHURY, University of Alaska Fairbanks, ABHIJIT BISWAS, University of Notre Dame, ILKER BAYER, Italian Institute of Technology — Metal-dielectric interfaces greatly influence the capacitor functions of nanodielectric composites. Nanodielectric composites of silver in PMMA were fabricated by electron-beam-assisted vapor phase codeposition at ambient temperature ($\sim 35^\circ$ C) in high vacuum. The fabricated samples containing 15- 65% silver reveal unique interfacial structure as studied by X-ray and atomic force microscopy. The capacitance of the as prepared samples were measured with an Agilent LCR meter at frequencies ranging from 20 Hz to 1 MHz. All nanodielectric composites show similar capacitor characteristic with a capacitor density of about 2.0 nF at 20 Hz to about 0.2 nF at 1 MHz., revealing continuous decrease in capacitor density with increasing frequency. This continuous decrease is a direct result of the interface between the silver granules and the dielectric material. This behavior, however, is in clear contrast with our recent study of BTO-PMMA nanocomposites (A. Biswas, et al., NNL, Vol. 1, 111-118, 2009), which show a stable capacitor function over a wide frequency range (20-80 MHz).

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Date submitted: 27 Nov 2010 Electronic form version 1.4