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Structural and dielectric properties of monodisperse TiO_2-paraffin core-shell nanoparticles[1] BALASUBRAMANIAN BALAMURUGAN, KRISTIN KRAEMER, RALPH SKOMSKI, STEPHEN DUCHARME, DAVID SELLMYER, Nebraska Center for Materials and Nanoscience and Department of Physics and Astronomy, University of Nebraska, Lincoln, Nebraska 68588. — Core-shell nanoparticles made of oxides having high dielectric constant and organic materials with large breakdown field are attractive candidates for higher-energy-density capacitors. In the present study, monodispersed TiO_2nanoparticles were produced using a cluster-deposition method and subsequently coated with uniform paraffin nanoshells using an *in-situ* thermal evaporation to form core-shell structure. The thickness of the paraffin nanoshells was varied by controlling the evaporation temperature of paraffin. The dielectric properties of TiO_2-paraffin core-shell nanoparticles show an enhanced effective dielectric constant with a decrease in the thickness of the nanoshells and also, reveal a minimum dielectric dispersion and low dielectric losses in the frequency range of 100 Hz – 1MHz, which are highly desirable for potential device applications.

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