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Characterization of universal dielectric response and negative capacitance in compressed nanopowders MADISON PERRY, STEPHEN TSUI, California State University San Marcos — Universal dielectric response (UDR) has been reported in disordered systems exhibiting percolative electrical conduction. Measurements of the complex impedance of a compressed pellet made up of alumina nanopowder reveal a low frequency dispersion of the off-phase component consistent with UDR. However, upon the application of applied dc bias beyond a certain voltage threshold, the dielectric behavior deviates from UDR and exhibits negative capacitance, which manifests as a pseudo-inductive phase angle in the complex impedance. This phenomenon has also been previously reported in other compressed nanopowder systems. We hereby examine the electrical impedances of various pellets made of different sized alumina nanopowders in an effort to correlate their applied bias-dependent dielectric behaviors with particle size.

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