

Abstract Submitted
for the TSF05 Meeting of
The American Physical Society

Negative static dielectric constant in a nano-colloid JASON SHULMAN, FENG CHEN, STEPHEN TSUI, YUYI XUE, Texas Center for Superconductivity at the University of Houston, University of Houston, C.W. CHU, Hong Kong University of Science and Technology; Texas Center for Superconductivity and Advanced Materials, University of Houston — We have observed a negative dielectric constant (ϵ'), at low frequencies, in colloids consisting of urea coated $\text{Ba}_{0.8}\text{Rb}_{0.4}\text{TiO}(\text{C}_2\text{O}_4)_2$ nanoparticles suspended in silicone oil. The dielectric constant has been shown to possess a plasma-like dispersion, which suggests that the static ϵ' retains the negative sign. Numerous studies have previously reported negative capacitances. While explanations vary, most of the reports attribute the effect to electrochemical reactions and delayed release of carriers. Our results indicate that these cannot be the origin of the negative dielectric constant observed in the colloid. Additionally, a sign change has been observed in the off-phase currents, which is consistent with the sign change of ϵ' .

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Date submitted: 12 Sep 2005

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