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**Electrorheological response of dense strontium titanyl oxalate suspensions** CARLOS ORELLANA, JINBO HE, HEINRICH JAEGER, James Franck Institute and Department of Physics, The University of Chicago, Chicago, IL 60637, USA — Strontium Titanyl Oxalate (STO) particles were synthesized using a new method of precipitating the STO out of a water solution by adding alcohol. When dispersed in silicon oil, dense STO suspensions exhibit a high static yield stress in the presence of an electric field (200kPa at 5kV/mm), high shear stress at high shear rates and low current densities. We also find that the yield stress increases roughly linearly with applied field. This behavior is a key characteristic of a polar molecule dominated electrorheological effect. We also observed stress stiffening with time under low shear, stress oscillations, and stress reduction with strain. These effects can be accounted for by the interaction of permanent dipoles with the particles, the creation of shear bands of a few particles in width and the lack of self-diffusion in the samples.

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