Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Creep and Recovery Behaviors of a Polythiophene-based Electrorheological Fluid** DATCHANEE CHOTPATTANANONT , Chiangmai University, ANUVAT SIRIVAT, PPC, Chulalongkorn University — We investigate the creep response of poly(3-thiopheneacetic acid) (PTAA) particles doped with perchloric acid. With increase of applied stress, these suspensions exhibit an evolution from a linear viscoelastic response, with three components of instantaneous elastic strain, retarded elastic strain and viscous strain, to a nonlinear viscoelastic response, where the retarded elastic and viscous strains monotonically decrease and a plastic contribution to the instantaneous strain grows, followed by a viscoplastic solid behavior, with fully plastic instantaneous strain, and finally a transition from plastic solid to a plastic liquid at the yield stress. With increase of electric field strength at fixed particle concentration and applied stress, the viscoplastic response diminishes, and more elastic behavior ensues. For highly-doped samples, at high electric field strengths, a fully elastic solid response is observed in the linear viscoelastic regime. The equilibrium compliance, $J_C$ and steady state recoverable compliance $J_R$, were investigated as a function of electric field strength, particle concentration and particle conductivity. The results are interpreted in terms of the field-induced formation of thick fibrillar aggregates spanning the gap between the electrodes, each consisting of bundles of particle strings.

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Date submitted: 14 Nov 2005 Electronic form version 1.4