Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Creep and Recovery Behaviors of Polyaniline/Silicone Oil Suspensions under Electric Field PIYANOOTH HIAMTUP, ANUVAT SIRIVAT, Chulalongkorn University — Creep and recovery behaviors of the PANI/silicone oil suspensions were investigated under action of electric field to explore the effects of field strength and particle concentration, and operating temperature on creep characteristics. At any applied shear stresses, the creep curves of this ER fluid show large instantaneous elastic response whereas the retarded elastic and the viscous responses are relatively small and they disappear as the applied stress is increased further. After the removal of the applied stress, the strain decreases but does not completely relax to the original value which indicates that this fluid exhibites a partially elastic recovery. However, it is noted that the recovery after stress removals disappears when the strain is higher than the critical values $\sim$ 0.4-0.5, independent of particle concentration and field strength. The particle arrangement to the more energy favorable state is suggested to occur. It is also found that above this range of deformation strain, creep resistance of EB/Silicone oil suspension is enhanced with these three parameters. A raise in temperature is additionally observed to increase the pliability of the ER structure.

Anuvat Sirivat
Chulalongkorn University

Date submitted: 09 Nov 2006 Electronic form version 1.4