Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Organoclay Networking in Polypropylene-Clay Nanocomposites
JAMES OBERHAUSER, MARK TREECE, University of Virginia — We report on networking of organoclays and its influence on the rheology of polypropylene-clay nanocomposites. Samples are blended using either a twin screw extruder (TSE) or a single screw extruder with *in situ* addition of supercritical CO_2 ($SCCO_2$). Blends contain proportional amounts (3:1) of maleic anhydride functionalized PP and organically modified montmorillonite (Cloisite® 15A, Southern Clay Products) at several clay loadings in a base PP resin (MFI 12 g/10 min at 230 $^\circ$C). Small-amplitude oscillatory shear (SAOS) and steady shear flow were utilized to probe clay morphology with varying annealing time. In SAOS experiments repeated over several hours, the terminal behavior of the TSE samples became increasingly solid-like; in steady shear, the magnitude of the viscosity overshoot increased with annealing time. The single-screw/$SCCO_2$ materials at the same clay loadings differed little rheologically from the neat resin. Finally, network formation kinetics accelerated with increasing temperature, and sufficiently large deformations irreversibly weakened the network structure.

James Oberhauser
University of Virginia

Date submitted: 28 Nov 2005 Electronic form version 1.4