17g Synthesis of Organophilic Laponite Nanoparticles and Their Assembly into Birefringent Organogels

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This talk will focus on dispersions of hydrophobically-modified laponite particles in organic liquids. Laponite is a synthetic clay that is present as nearly monodisperse disks of 30 nm diameter and 1 nm thickness. We have treated the particles with a long-tailed surfactant so as to render their surface hydrophobic. The resulting organolaponite particles can be easily dispersed into organic liquids such as toluene and xylene. The dispersions are viscous sols at low particle concentrations and transparent gels at high concentrations (~ 10 wt.%). When examined under polarized light, the gels show a strong static birefringence, which is reminiscent of nematic liquid crystals. This behavior is similar to that of the native laponite particles in aqueous media. We will present the structural phase diagram (isotropic/nematic, sol/gel) for the organolaponite systems by combining visual observations, optical microscopy, and dynamic rheological techniques. Additionally, we will describe the interest in using these nematic organogels as a route towards the in-situ synthesis of nematic polymer nanocomposites.