Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Synthesis and Self-Assembly Behaviors of Polyhedral Oligomeric Silsesquioxane Based Giant Molecular Shape Amphiphiles[1] KAN YUE, XINFEI YU, CHANG LIU, WEN-BIN ZHANG, STEPHEN CHENG, Department of Polymer Science, The University of Akron — Recently, our group has focus on the synthesis and characterization of novel giant molecular shape amphiphiles (GMSAs) based on functionalized molecular nanoparticles (MNPs), such as polyhedral oligomeric silsesquioxane (POSS), tethered with polymeric tails. A general synthetic method via the combination of sequential ?click? reactions has been developed and several model GMSAs with various tail lengths and distinct molecular topologies, which can be referred as the ?giant surfactants?, ?giant lipids?, ?giant gemini surfactants?, and ?giant bolaform surfactants? etc., have been demonstrated. Studies on their self-assembly behaviors in the bulk have revealed the formation of different ordered mesophase structures with feature sizes around 10 nanometers, which have been investigated in detail by small angle X-ray scattering (SAXS) technique and transmission electron microscopy (TEM). These findings have general implications on understanding the underlying principles of self-assembly behaviors of GMSAs, and might have potential applications in nano-patterning technology.

[1]This work is supported by NSF (DMR-0906898) and the Joint-Hope Foundation.

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Date submitted: 09 Nov 2012 Electronic form version 1.4