Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Aggregation, Gelation and Glass Transition in Mixed Suspension of Polystyrene Microsphere and Poly(N-isopropyl-acrylamide) Microgel[1]

GUANGCUI YUAN, CHUANZHUANG ZHAO, CHARLES C. HAN, Institute of Chemistry, Chinese Academy of Science, JOINT LABORATORY OF POLYMER SCIENCE & MATERIALS, ICCAS TEAM — Poly(N-isopropylacrylamide) microgel is adsorbable to the polystyrene microsphere surface. The saturated adsorption concentration of microgel ($\Phi*_{MG}$) is in a linear relationship with the given concentration of microsphere (Φ_{MS}). Depending on the concentration of microgel (Φ_{MG}) added into the suspension microspheres, the microgel can induce bridging ($\Phi_{MG} < \Phi*_{MG}$), stabilizing ($\Phi_{MG} = \Phi*_{MG}$) and depletion ($\Phi_{MG} > \Phi*_{MG}$) effect. With combination of various Φ_{MS} and $\Phi_{MG}/\Phi*_{MG}$, different structures including stable solution, bridging and depletion cluster, bridging and depletion gel, attractive glass and repulsive glass, were obtained. The transitions between these states were investigated by rheology and microscopy. Two-step yielding behavior was observed in attractive glass, which was contributed from bridging bonds of microgels and caging effect of dense microspheres.

[1]This work is supported by the National Basic Research Program of China (973 Program, 2012CB821503)

Guangcui Yuan
Institute of Chemistry, Chinese Academy of Science

Date submitted: 17 Dec 2012 Electronic form version 1.4