

Dispersions and structures of polymer nanocomposites

김소연[†]

울산과학기술원

(soyounkim@unist.ac.kr[†])

The states of nanoparticle dispersions in concentrated polymer solutions are studied with extensive small angle scattering and NMR experiments. Silica nanoparticles are suspended in polymer-solvent mixtures. The effects of polymer induced interactions on the particle microstructure are examined with varying (i) polymer concentration, (ii) solvent type, (iii) temperature, (iv) particle volume fraction and (v) polymer chemistry while polymer-to-solvent volume ratio is held between 0.45 and 1. The local order and long wave length concentration fluctuations of nanoparticles are obtained from the analysis of scattering structure factors and compared with the Polymer Reference Interaction Site Model (PRISM) theory. Exploiting contrast matching small-angle neutron scattering all partial collective structure factors of particles, polymers and their interface are characterized establishing the existence and size of adsorbed polymer layers. Later in this talk, non-equilibrium effect of polymers on particle dispersions will be discussed.