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**Capillary interactions between silica-particles in organic solvents**
GARFIELD WARREN, DOBRIN BOSSEV, Indiana University — Small-angle neutron scattering (SANS) is used to study the interactions of silica nano-particles with an average diameter of 10 nm in methanol and methanol/toluene mixtures at 25 °C. SANS intensities are analyzed as a product of a form factor and a structure factor. Methanol is a polar solvent with a dielectric constant of e = 32 at ambient temperatures the interaction of silica in methanol is considered to be through electrostatic repulsion. The presence of toluene reduces the polarity of the solvent since toluene is a non-polar liquid with e = 2. At fractions of toluene less than 44 %, the dispersion of silica particles is stable and non-viscous. The analysis of the structure factor shows that the silica particles reduce their charge with increasing fraction of toluene. At intermediate fractions of toluene, between 44 and 65 %, the viscosity increases by two orders of magnitude which suggests formation of two dimensional network of silica particles. Computer simulations of a pearl necklace-like chain of spheres is conducted to explain the structure factor at these intermediate fraction of toluene.

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