

355b Dynamics of Microparticles at Oil-Water Interfaces

Sowmitri Tarimala, Chih-yuan Wu, and Lenore L. Dai

Particle mobility, aggregate structure, and the mechanism of aggregate growth at the two-dimensional level have been of long-standing interest. Here we use Pickering emulsions as a model system to investigate the mobility of charged microparticles at polydimethylsiloxane (oil)-water interfaces using confocal laser scanning microscopy. Remarkably, the rate of diffusion of the charged colloidal-sized polystyrene particles at the oil (5 cSt)-water interface is only moderately slower than in the bulk water phase. The ambient diffusion constant of solid particles is significantly reduced from 1.1×10^{-9} cm²/s to 2.1×10^{-11} cm²/s when the viscosity of the oil phase increases from 5 cSt to 350 cSt. In addition, we have investigated the influences of interfacial curvature and successfully observed the in-situ structural formation of solid particles at the oil-water interface.