

Abstract Submitted
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Polymer Grafted Nanoparticle-based Oil Dispersants DAEHAK KIM, RAMANAN KRISHNAMOORTI, Univ of Houston — Particle-based oil dispersants mainly composed of inorganic nanoparticles such as silica nanoparticles are considered as environmentally friendly oil dispersants due to their biocompatibility and relatively low toxicity. The oil-water interfacial tension is reduced when nanoparticles segregate to the oil-water interface and this segregation is improved by grafting interfacially active polymer brushes. In this study, surfactant-like amphiphilic block copolymers were grafted from silica nanoparticles using an atom transfer radical polymerization (ATRP) method in order to increase their interfacial activity. We have studied the interfacial activity of such hybrid nanoparticles using pendant drop interfacial tension measurements, and their structure using small angle X-ray scattering. Amphiphilic copolymer grafted nanoparticles significantly reduced oil-water interfacial tension compared to the interfacial tension reduction induced by homopolymer grafted nanoparticles or the corresponding free ungrafted copolymer. Moreover, hard and stable oil-water emulsions were formed by applying the block copolymer grafted nanoparticles due to the formation of interparticle network structures, which were observed by cryo-scanning electron microscopy (SEM) and small angle neutron scattering (SANS)

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