

Synthesis and Characterization of Core-Shell Particles with Perfluorinated Cores

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Abstract

Colloidal Dispersions are widely used as model systems. For example, core-shell colloids have been used to investigate the single particle dynamics near the glass transition employing them as tracer particles in light scattering and video microscopy. For this purpose there are two main requirements: First, the shell and the host particles should be made of the same polymer to eliminate interaction effects. Second there should be a refractive index difference between the core and the shell, so that the cores of the tracer particles are still visible under index match conditions. In addition, for the use in video microscopy, the particles should be sufficiently large (diameter > 1 μm). We report on the synthesis of core-shell particles with a PFA-core (tetrafluoroethylene copolymerized with perfluoroalkylvinyl ether) and a crosslinked polystyrene shell. The shell was synthesized stepwise by seeded growth emulsion polymerization up to a shell thickness of 500 nm. The dispersions were characterized by TEM and static and dynamic light scattering. The core-shell structure and the refractive index of the particles was investigated by means of a light scattering contrast variation study.