

Polystyrene/Laponite Nanocomposites by Emulsion Polymerization

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ABSTRACT

Hybrid latexes of PS/Laponite have been synthesized by emulsion polymerization of styrene in presence of Laponite RD, using methyl ether acrylate-terminated poly(ethylene glycol) macromonomer as mediator. The polymerizations were performed via batch processes using a tiny amount of the PEG based macromonomer and without any classical surfactant. The evaluation was done in terms of the latex colloidal stability, reaction's kinetics and final properties of the nanocomposites. The Laponite RD as well as the nanocomposites was characterized by X-ray diffraction analysis (XRD). The average particle size as well as the particle size distribution was determined by dynamic light scattering (DLS). The mechanical and thermal properties of the nanocomposites were characterized by dynamical-mechanical analysis (DMA), thermogravimetry (TG) and differential scanning calorimetry (DSC). In addition, scanning electron microscopy (SEM) analyses were carried out in order to visualize the composite microstructure. The kinetics measurements indicate a pronounced effect of the clay on the nucleation and stabilization of the latex particles.

Keywords: hybrid latexes, clay, emulsion polymerization, nanocomposites, colloids.