

The stability and properties of polystyrene/kaolinite nanocomposites by emulsion polymerization

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Materials used as nanoparticles in polymer nanocomposites are nanospheres (for example TiO₂, with diameters between 50-200nm[2] and Au, whose diameter is around 148nm ± 36nm[3]); nanotubes (for example carbon, with diameter in the range of 40-50nm[4] and halloysite, whose diameter is in the range of 30-100nm); nanowhiskers (for example cellulose, with a diameter in the range of 40-70nm); and nanofibers (for example carbon fibers, exhibiting an average diameter of 3.2nm, and natural and synthetic clays) [5]. The aim of this work was to study the stability and morphological properties of polystyrene latex containing kaolinite, as filler, during the process of synthesis of nanocomposites by emulsion polymerization. Nanocomposites with 1, 3 and 5wt% of kaolinite were prepared. Latexes with 1 to 3 wt% of clay were stable during the polymerization reaction. Hydrodynamic diameters of 93.68 and 82.11 nm were found for latexes with 1 and 3 wt% of kaolinite, respectively. The addition of 1 to 3 wt% of kaolinite during the reaction did not influence the reaction conversion curves and the number of particles. X-ray diffraction (XRD) and unconventional techniques of Scanning Electron Microscopy (SEM) and High Resolution Transmission Electron Microscopy (HRTEM) showed, by good images, the presence of exfoliated and intercalated structures of clays.

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