

New Approach to Encapsulated Clay/Wax Nanocomposites Inside Polystyrene Particles via Miniemulsion Polymerization

Authors : Nagi Greesh

Abstract : This study highlights a new method to obtain multiphase composites particles containing hydrophobic (wax) and inorganic (clay) compounds. Multiphase polystyrene-clay-wax nanocomposites were successfully synthesized. Styrene monomer were polymerized in the presence of different wax-clay nanocomposites concentrations in miniemulsion. Wax-clay nanocomposites were firstly obtained through ultrasonic mixing at a temperature above the melting point of the wax at different clay loadings. The obtained wax-clay nanocomposites were then used as filler in the preparation of polystyrene-wax-clay nanocomposites via miniemulsion polymerization. The particles morphology of PS/wax-clay nanocomposites latexes was mainly determined by Transmission Electron Microscopy (TEM) , core/shell morphology was clearly observed, with the encapsulation of most wax-clay nanocomposites inside the PS particles. On the other hand, the morphology of the PS/wax-clay nanocomposites (after film formation) ranged from exfoliated to intercalated structures, depending on the percentage of wax-clay nanocomposites loading. This strategy will allow the preparation materials with tailored properties for specific applications such as paint coatings and adhesives.

Keywords : polymer-wax, paraffin wax, miniemulsion, core/shell, nanocomposites

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