

Polypropylene-Clay Nanocomposites: Formulation, Microstructure and Performance

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Nanoclay-reinforced polypropylene nanocomposites have been prepared by means of melt processing technology. Different formulations and processing conditions have been investigated in order to optimize the chemical and the physicochemical interaction between the polymer matrix and the inorganic nanoclay phases as well as the nanoclay dispersion. Different techniques like Fourier transform infrared spectroscopy (FT-IR), X-ray diffraction, transmission electron microscopy (TEM), thermogravimetry (TGA), differential thermal analysis (DTA), and dynamic mechanical thermal analysis (DMTA) were used to study the chemical interactions between the polymer and the organo-nanoclay as well as the dispersion of the nanoclay. The processing ability and various properties such as the physicochemical, the mechanical and thermal stability, have been evaluated. The relationship between the formulation, processing conditions, microstructure and nanostructure and performance were discussed.