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PREPARATION AND CHARACTERIZATION OF THERMALLY STABLE POLYPROPYLENE-HETEROCYCLE-EXCHANGED MONTMORILLONITE NANOCOMPOSITE

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Recently, much attention has been paid to polymer nanocomposites, especially polymer-layered silicate nanocomposites, which represent an alternative to conventional filled polymers. In general, in order to facilitate the interaction of silicate layers with a polymer, the clay is modified with an alkylammonium salt (surfactant molecule) by a cation-exchange reaction, because the alkylammonium makes the hydrophilic clay surface organophilic.
This work aimed at the synthesis of new heterocyclic surfactants thermally stable with various chain lengths and uses them to modified montmorillonite (MMT) by ion exchange reaction. All surfactants were characterized by ^{1}H and ^{13}C NMR, FTIR spectroscopy and mass spectrometry.
The successful of intercalation was determined using X ray diffraction (XRD), Fourier transform Infrared (FTIR) and thermogravimetric analysis (TGA). The presence of hydroxide group in organic modifiers plays an important role in thermal stability and increase of gallery spacing of montmorillonite. XRD patterns of smectite organoclays shows that, with an organic modifier of the same chain length, the gallery spacing of organoclay was largest for with hydroxide group and smallest for other surfactants.
The dispersion of organically modified montmorillonites in polypropylene matrix was studied. Exfoliated nanocomposites were obtained using 3% of organoclay.