

Faculty of Science

Department: Chemistry

Name: Ahmed Akelah,

Title: Polystyrene nanocomposite materials by in-situ polymerization into montmorillonite-vinyl monomer interlayers.

Authors: Ahmed Akelah, Ahmed Rehab, Tarek Agag & Mohamed Betiha

Published In: Journal of applied polyer science, 103(6),(2007)

Impact Factor: 1.306

Abstract:

A different series of new polystyrene-clay nanocomposites have been prepared by grafting polymerization of styrene with vinyl-montmorillonite (MMT) clay. The synthesis was achieved through two steps. The first step is the modification of clay with the vinyl monomers, such as N,N-dimethyl-n-octadecyl-4-vinylbenzyl-ammonium chloride, n-octadecyl-4-vinylbenzyl-ammonium chloride, triphenyl-4-vinylbenzyl-phosphonium chloride, and tri-n-butyl-4-vinylbenzyl-phosphonium chloride. The second step is the polymerization of styrene with different ratios of vinyl-MMT clay. The materials produced were characterized by different physical and chemical methods; (1) IR spectra, confirming the intercalation of the vinyl-cation within the clay interlayers; (2) thermogravimetric analysis (TGA), showing higher thermal stability for PS-nanocomposites than polystyrene (PS) and higher thermal stability of nanocomposites with of phosphonium moieties than nanocomposites with ammonium moieties; (3) swelling measurements in different organic solvents, showing that the swelling degree in hydrophobic solvents increases as the clay ratio decreases; (4) X-ray diffraction (XRD) , illustrating that the nanocomposites were exfoliated at up to a 25% of organoclay content; and (5) scanning electron microscopy (SEM), showinn a complete dispersion of PS into clay galleries. Also, transmission electron microscopy (TEM) showed nanosize spherical particles of 150-400 nm appearing in the images.

Key words:

polymer-clay nanocomposites; polystyrene-nanocomposites; polystyrene-montmorillonite nanocomposies; intercalated polystyrenem polymer-clay hybrids.

Faculty of Science

Department: Chemistry

Name: Ahmed Akelah

Title: Preparation and applications of controlled release systems based on intercalated atrazine salt and polymeric atrazine salt onto montmorillonite clay.

Authors: Ahme dSkelah, Ahmed Rehab & Maisa M. El-Gamal

Published In: Material sciences and engineering C:28 (2008)

Impact Factor:1.599

Abstract:

Polymer-clay composites carrying atrazine and polymeric atrazine salts as new controlled release systems have been prepared . Polymeric atrazine was prepared by polycondensation of atrazine with diethyl 2,3-O-dichloroacetyl-tartrate and diethyl-tartrate. The intercalation of the atrazine and polymeric atrazine salts onto MMT ws carried out through cation exchange process. The characterizations of the prepared materials were determined by a various analytical techniques. The release rate of the active herbicide from the products was determined in both aqueous medium at different pH and salt concentration and in soil column. The release from the intercalated compound in the soil takes place within one month, while the free atrazine was lost completely through leaching after four days. The pots and field applications of the intercalated compounds on some herbs and maize were investigated. The results of this study showed high activity of the prepared compounds on the hers inhibition and in the same time increasing the growth rte of maize compared with the conventional herbicide.