Effect of trihexyltetradecylphosphonium on thermal degradation properties of low linear density polyethylene/montmorillonite nanocomposites

Mohd Aidil A. Abdullah, author

Abstrak

Low linear density polyethylene/organo-montmorillonite (LLDPE/OMMT) nanocomposites at 1–5 wt% OMMT loading were prepared by the melt intercalation technique. The OMMT was synthesized via an ion exchange reaction by replacing the interlayer of sodium ions (Na+) in the repeating unit of silicate layers of montmorillonite (MMT) with the cationic surfactant in the form of trihexyltetradecylphosphonium (THTDP) ions. The obtained OMMT and its nanocomposites were characterized by X-ray diffraction, Fourier transform infrared spectroscopy, and elemental and thermogravimetric analyses. The interlayer spacing of MMT expanded from 1.41 to 2.29 nm due to the accommodation of THTDP ions in the intergallery of OMMT. The introduction of THTDP in the interlayer of OMMT rendered better dispersion of OMMT layers in the LLDPE/OMMT nanocomposites and significantly improved the thermal degradation properties of nanocomposites as compared to the pristine LLDPE.