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PHOTO-STABILIZATION OF POLYPROPYLENE-CLAY NANOCOMPOSITES : EFFECT OF HINDERED AMINE LIGHT STABILIZERS ON DURABILITY

Naima TOUATI*[1], Mustapha KACI[1], Yves GROHENS[2], Stephane BRUZAUD[2]

[1]*Laboratoire des Matériaux Organiques, Faculté de la Technologie, Université Abderrahmane Mira, Bejaia 06000, Algeria.*

[2]*Laboratoire d'Ingénierie des Matériaux de Bretagne, Equipe Polymère, Propriétés aux Interface et Composites (L2PIC), Rue Saint Maudé, Lorient, France.*

In the recent years, several studies have been undertaken on the preparation and characterisation of PP–clay hybrids using different methodologies. This new generation of materials is actually used in some domains such us automotive, packaging and aerospacial application. However, the use of such materials depends on their durability in a particular environment in which they are applied and their interaction with environmental factors. For this reason, the study of degradation and stabilization of polymer nanocomposites is an extremely important area from both academic and technological point of view. Therefore, the understanding of the degradation mechanism of these materials under service condition permits prolongation of the service life. Photooxidation of polypropylene filled with montmorillonite has been studied and it is established that the polymer nanocomposite degrade faster than the pristine one due to combination of degradation mechanisms of alkyl-ammonium cation exchanged in MMT and the catalytic effect of montmorillonite. Literature review in the field of stabilisation of polymer nanocomposites is rather scarce. Therefore, the objective of this work was to study the efficiency of alkoxylamine ether which belongs to the family of hindered amine light stabilizers (HALS) on the photooxidation of PP-clay nanocomposites. The chemical modifications and the thermal properties induced by degradation were investigated by infrared spectroscopy and DSC, respectively. The efficiency of the photostabilizer was evaluated by measuring the half life time determine from FTIR spectra. The whole results were discussed on the basis of both the unstabilized nanocomposite samples and the neat polymer. The study showed that the presence of HALS in the nanocomposite samples improved significantly the life time in comparison with the unstabilized ones. However, the degradation rate of the stabilized PP-clay nanocomposites was found to be much faster than the stabilised PP.