11th International Conference
on Advanced Materials

Rio de Janeiro Brazil
September 20 - 25

ICAM2009

Processing and Thermal and Morphological Properties of Metallocene LLDPE Nanocomposites

D. P. S. Dalto[(1)*], M. J. O. C. Guimarães[(1)] , M. E. F. Garcia[(2)] and L. C. Mendes[(3)]

(1) Departamento de Processos Orgânicos, Escola de Química/UFRJ, daniele@eq.ufrj.br.
(2) Programa de Engenharia Química, COPPE/UFRJ
(3) Instituto de Macromoléculas Prof. Eloísa Mano/UFRJ.
* Corresponding author.

Abstract – Polymeric nanocomposites are a new class of composites that contain small quantities of nanoparticle, with one of its dimensions in the nanoscale. The aim of this work was to study the processing and thermal and morphological properties of nanocomposites based on metallocene linear low density polyethylene and an organically surface modified montmorillonite in different concentrations by melting mixing. The nanocomposites were characterized by X-ray diffraction, thermal analysis and microscopy. The Nanocomposites exhibited better properties than the pure polymer.

The interest in obtaining nanocomposites is the great improvement of the properties, mainly mechanical, thermal and barriers to gases[1]. The nanocomposites have gained importance in various markets such as construction, textiles and packaging. The objective of this study was to study the processing and the properties of nanocomposites, containing mLLDPE and different concentrations of organically modified montmorillonite, Nanomer I.44P from Nanocor, using PE-g-MA as compatibilizer. Nanocomposites were prepared by melt mixing at 180ºC, for 20 min and rotor speed of 90 rpm. Melting temperature and crystallinity of mLLDPE did not have considerable change (Table 1 and Fig. 2). Nanocomposites were more resistant to thermal degradation that mLLDPE (Fig.1). The incorporation of nanoclay in the mLLPDE matrix changed its color and transparency.

Table 1: Thermal Property of mLLDPE and Nanocomposites

Material(wt%)	Melting Temperature(K)	Crystallinity(%)
mLLDPE	385	34
mLLDPE/Organoclay(97,5:2,5)	384	34
mLLDPE/ PE-g-MA(92:8)	383	34
mLLDPE/Organoclay/PE-g-MA(90:2,5:7,5)	383	32

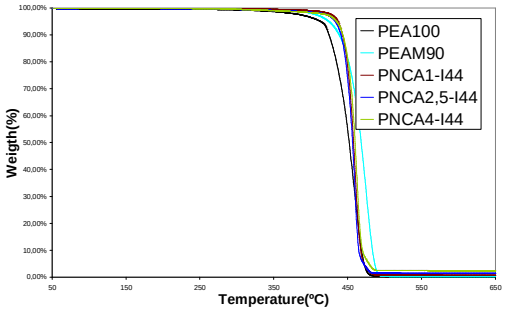

Figure 1: Temperature dependence on the weight loss for mLLDPE, mLLDPE/PE-g-MA and Nanocomposites.

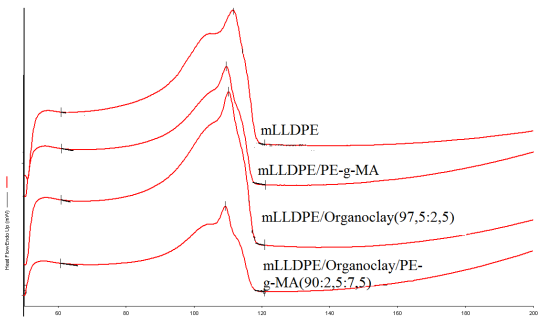

Figure 2: DSC Thermograms.

References

[1] L.A. Utracki, *Clay-Containing Polymeric Nanocomposites*, Rapra Technology, Shawburi, UK, 2004.