Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09489, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09489
EGU General Assembly 2008

Crystalline properties of injection molded Polyamide-6 and Polyamide-6/montmorillonite nanocomposites

A. Yebra-Rodríguez (1), P. Alvarez-Lloret (2), C. Cardell (2), A.B. Rodríguez-Navarro (2)

(1) Dept. of Geology, Faculty of Experimental Science, University of Jaen, Campus Las Lagunillas, s/n, 23071 Jaén, Spain. (ayebra@ujaen.es) (2) Dept. of Mineralogy and Petrology, Faculty of Science, University of Granada, Campus Fuentenueva s/n, 18002 Granada, Spain.

Polymer/clay nanocomposites are suitable for many industrial applications (Hong et al., 2005; Aranda et al., 2006; Xu et al., 2006). The mechanical properties of the pristine polymers and polymer-clay nanocomposites are mainly dependent on crystal properties, as the packing parameters will determine the inter-chain interactions in the different type of crystals. Processing conditions during injection molding do affect the crystal structure and the crystallinity of the samples.

Injection molded samples of polyamide-6 and polyamide-6/montmorillonite nanocomposites were examined by means of X-Ray Diffraction, Differential Scanning Calorimetry, Small Angle X-Ray Scattering and Transmission Electron Microscopy. The crystal structure and the degree of crystallinity are dependent on the sample thickness. The crystalline components of the nanocomposite samples were in all cases significantly more oriented than the pure polymer, whereas the SAXS analyses show that the lamellae (a suprastructure resulting from the organization of both the crystalline and the amorphous parts of the polyamide-6) in the nanocomposites are slightly more oriented compared to the pure polymer samples.

References:

Aranda, P., Darder, M., Ferna´ndez-Saavedra, R., Lo´pez-Blanco, M., Ruiz-Hitzky, E., 2006. Thin Sol. Films 495, 104-112.

Hong, C.H., Lee, Y.B., Bae, J.W., Jho, J.Y., Nam, B.U., Hwang, T.W., 2005. J. Appl. Polymer Sci. 98, 427-433.

Xu, B., Zheng, Q., Song, Y., Shangguan, Y., 2006. Polymer 47, 2904–2910.