



STUDY OF POLYPROPYLENE/CLOISITE NANOCOMPOSITES UNDER ENVIRONMENTAL AGEING

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Polypropylene is a commodity polymer used in a wide range of products ranging from automotive applications such as automotive bumpers and packaging applications such as food packing bags. Use of silicate nanolayers that have much larger aspect ratios can enhance significantly stiffness and scratch resistance at a much lower loading [1]. This work concerns to the study of the environmental ageing nanocomposite, (HMSPP) Polypropylene High Melt Strength (obtained at dose of 12.5 kGy) and addition of 5 and 10 wt% of organoclay with Cloisite 20A nanocomposite. The agent compatibilizer polypropylene-graft, (PP-g-AM) was added at 3% concentration and the clay was dispersed through melt intercalation technique using a twin-screw extruder. The dumbbell samples were manufactured and settled in a device for natural ageing assay in the IPEN-SP [2].

This work investigated changes in mechanical proprieties (elongation and rupture strength), the thermal behavior was evaluated by the technique of differential scanning calorimetry (DSC), the morphology of the nanocomposites was studied by scanning electron microscopy (SEM) and spectroscopy Fourier transform infrared (FTIR) in nanocomposites PP/Cloisite 20 A. After 3 moths of environmental ageing were observed intense cracks of the samples.

Keywords: Nanocomposites, Polypropylene, Clay Cloisite, HMSPP and Gamma Irradiation

References

[1] "Polymer Nanocomposites", Edited by Yiu-Wing Mai and Zhong-Zhen Yu, Chapter 4 - Polypropylene layered silicate nanocomposites, K. Jayaraman and S. Kumar, 1st. edition, Woodhead Publishing Limited - England, 2006.

[2] Oliani, W. L., 2008, Mater`s Dissertation. "Study of HMS-PP (high melt strength polypropylene) behaviour under conditions of environmental and accelerated degradation". IPEN-USP. <http://www.teses.usp.br/teses/disponiveis/85/85134/tde-25082009-155558/en.php>