

Polystyrene modification by cellulose derivative and organoclay

L. Gjurgjaj¹, E. Nushi², A. Mele^{2,3}, A. Mele³, D. Mele³, I. Qoshja³

¹Department of Chemistry, Faculty of Natural Sciences, University of Tirana, Bulevardi "Zog I", Nr. 25/1, 1016 - Tirana, Albania,

²Center of Techniques Studies, Ivodent Academy, Rr. "Prokop Myzeqari", nr. 10, Tirana, Albania

³Department of Prosthodontics, Ivodent Academy, Rr. "Prokop Myzeqari", nr. 10, Tirana, Albania

lorenci.gjurgjaj@fshnstudent.info

Compounding of polystyrene (PS) with tetramethylsilyl cellulose (TMSi-Cell) and an organically modified montmorillonite (OMMMT) was carried out in two different ways. In the first way the PS of MW = 49000 and Mn = 32000 was solved in toluene, than mixed with the nanocomposite dispersion of TMSi-Cell/OM-MMT (10.5 %) in toluene and dried in an oven at 380 mbar/40°C for 20 hours. In the second way the bulk polymerization of PS was tried as a way to obtain PS/TMSi-Cell/OM-MMT nanocomposite. The polymerization followed in a mixture of styrene with TMSi-Cell/OM-MMT (10.5 %) in an oil bath at 80 °C for 4 hours and at 120 °C for 16 hours. Nanocomposites of TMSi-Cell/OM-MMT were firstly prepared by precipitation from toluene experimenting concentrations from 10.5

% to 29.35 % of OM-MMT to TMSi-Cell. The thermal properties of the nanocomposites, were investigated by thermogravimetry and the morphologies of these nanocomposites were evaluated through X-ray diffraction. The 10.50 % OMMMT/TMSi-Cell nanocomposite showed a completely exfoliated morphology. PS/TMSi-Cell/OM-MMT mixtures were characterized by X-Ray Diffraction, Thermogravimetry and Differential Scanning Calorimetry. Differences in the degradation temperature compared to pure PS show compounding.

[1] S. Thomas, C. Harrats, G. Groeninckx, in: "Micro and Nanostructured multiphase Polymer Blend Systems". C. Harrats, S. Thomas, G. Groeninckx, Eds, CRC Press, Boca Raton 2006, ch.

[2] C. Kato, K. Kuroda, H. Takahara, Clay Clay Miner 1981, 29, 294-300. [3] W. Mormann, Cellulose, 2003, 10(3), 271-281.

[3] M. Alexandre, P. Dubois, P. Mater Sci Eng 2000, 28, 1.

Keywords: Nanocomposite; polystyrene; organically modified montmorillonite