

Synthesis and Characterization of Polymer Nanocomposites with Inorganic Filler for Textile Applications

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Abstract –

Approaches to modify the polymer nanocomposite system by various inorganic or organic substances can lead to a huge number of additional functionalities which are increasingly demanded by the textile industries. In this study a series of nanocomposites was prepared by intercalation of 2-aminobenzene sulfonic acid with aniline monomers in the modified clay. The clay was prepared by a cation exchange process between the sodium cation in (Clay-Na) and the copper cation (Clay-Cu). The materials obtained were characterized by different methods such as: X-Ray Diffraction (XRD), Thermo-Gravimetric Analysis (TGA), Microscopic Electron Transmission (MET), UV-Vis and Fourier Transformation Infra Red (FTIR). The results of the XRD analyses show the manifestation of basal spacing for Clay-Cu changes as a function of the inorganic cation and the polymer intercalated in the Clay-Cu structure. The value of the basal spacing was increased from 12.91 to 14.54 Å, with the increase of the aniline content in the copolymer. The TGA analyses reveal that polymer/Clay-Cu composites are less stable than Clay-Cu. The conductivity of the composites is 103 times higher than that of Clay-Cu. The TEM image of the nanocomposite, have shown an entirely different and more compatible morphology. Remarkable differences in polymer properties were also observed by UV-Vis and FTIR, suggesting that the polymer produced in the presence of aniline has a higher degree of branching. These results are heartening in respect with the objective to utilize them in the field of textile technology.

Keywords : Nanocomposite, Characterization, polymer, textile applications.