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Morphology and thermal stability of cellulose acetate butyrate and poly (ethyl methacrylate) nanoblends

Enhancing miscibility, mechanical and thermal properties of polymer blends by adding a nanofiller has received increasing attention in both scientific and industrial communities. Ternary nanoblends (PEMA/CAB/OMMT) based on cellulose acetate butyrate/ poly (ethyl methacrylate) blends, of different ratios (30/70, 50/50 and 70/30), and an organically modified bentonite (OMMT) (1, 2 and 4%) were prepared by solution method. The PEMA/CAB/OMMT samples were characterized by transmission electronic microscopy (TEM), Thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC). These nanoblends were elaborated for the purpose of studying the effect of OMMT on the morphology and thermal behavior of PEMA/CAB blends. In order to have more information on the morphology of the nanoblends at the nanometric scale, a study was carried out by TEM. The PEMA/CAB/OMMT1% and PEMA/CAB/OMMT4% were analyzed at different level of magnifications. According to the TEM micrographs, a better dispersion of the OMMT is observed with the nanoblend (70/30/1%) compared to the system with 4% of OMMT. TEM micrographs highlight the formation of nanomaterial of intercalated and intercalated/partially exfoliated structures. The single T_g observed with the PEMA/CAB blends and their nanoblends is an evidence of their miscibility. Moreover, the presence of the OMMT in the PEMA/CAB matrix has a positive influence on their thermal stability. Thermograms of PEMA/CAB/OMMT systems show a better thermal stability than the virgin blend.

Preferred topic

Biopolymers

Primary authors: KADI, Souad (Laboratoire des Matériaux Polymères, Faculté de chimie, USTHB); OUAAD, Kamal (Laboratoire des Matériaux Polymères, Faculté de Chimie, Alger - Université M'Hamed Bougara, Département de Chimie, Faculté des Sciences, Alger); Prof. DJADOUN, Said (Laboratoire des Matériaux Polymères, Faculté de Chimie, Université des Sciences et de la Technologie Houari Boumediene)

Presenter: OUAAD, Kamal (Laboratoire des Matériaux Polymères, Faculté de Chimie, Alger - Université M'Hamed Bougara, Département de Chimie, Faculté des Sciences, Alger)