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Miscibility, thermal stability and non-isothermal decomposition kinetic of polymer blends based on poly (vinyl chloride) and poly (methyl methacrylate-co-4-vinyl pyridine)

To develop new polymer materials with new properties, polymer mixtures are one of the most used methods. A mixture of two polymers may lead either to interpolymer complex or to a blend. The temperature, the solvent and the hydrophobicity of the polymers are among the most important factors that influence the formation and stability of such polymer mixtures. Proton donor poly (vinyl chloride) (PVC) and proton-acceptor poly (methyl methacrylate-co-4-vinylpyridine) (MM4VP-x) copolymers (x% is amount of 4-vinylpyridine) was prepared by free radical polymerization and characterized. Due to the acidic hydrogen atom of PVC and 4-vinylpyridine specific interactions that occurred up on mixing pairs of these polymers, a soluble or precipitate interpolymer complexes or blends, can be obtained in THF and butan-2-one. Preliminary tests of miscibility and complexation of PVC/MM4VP-x mixtures were performed in THF. A viscometry study confirms the obtaining one (soluble complex) of the two types of interpolymer complexes from the behavior of the reduced viscosity of their blend solutions with blend composition. The FTIR spectra of PVC/MMV4P-x blends in the 1620-1580 cm^{-1} region confirms the presence of the peak at 1606 cm^{-1} of specific interactions. The glass temperature transition T_g of all mixtures of the system PVC/MM4VP-31 were determined using the differential scanning calorimetry (DSC). This latter reveals the existence of a single T_g in the whole area of the composition. Theoretical kwei and Brostow approaches were used to describe the T_g -composition behaviours. A thermal stability study of PVC/MMV4P-x mixtures using TGA was performed. The kinetic method Tang et al. [1] was applied to study the degradation kinetic of materials. The activation energies, the degradation kinetic models, the pre-exponential factors of the PVC, MM4VP-x and those of their blends were determined.

1. W. Tang, Y. Liu, H. Zhang, C. Wang, *Thermochimica Acta* 408 (2003), 39-43.

Preferred topic

Polymers and environment

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