

Polymer Composites

Effect of organoclay on the properties of maleic-anhydride grafted polypropylene and poly(methyl methacrylate) blend

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Abstract

Poly(methyl methacrylate)/polypropylene (PMMA/PP) and PMMA/maleic-anhydride grafted PP (MAPP) blends and their blend nanocomposites containing 2 wt% organoclay (Cloisite 15A, denoted C15A), prepared by a melt mixer were studied. Both X-ray diffraction (XRD) and transmission electron microscopy (TEM) revealed exfoliated polymer blend nanocomposites. Scanning electron microscopy (SEM) studies indicated a droplet dispersion morphology for all the blends while addition of C15A into PMMA/MAPP blend resulted to a co-continuous morphology. In fact, rheological data and thermal properties indicated that the PMMA/MAPP/C15A nanocomposite showed a better homogeneous dispersion of silicate layers than PMMA/PP/C15A nanocomposite. A Cole–Cole plot and relaxation modulus indicated a solid-like character for PMMA/MAPP and PMMA/MAPP/C15A, while a liquid-like behavior was noticed for PMMA/PP and PMMA/PP/C15A. The effect of an organoclay on the dynamic mechanical properties of samples was investigated using dynamic mechanical analysis (DMA) which showed a significant enhancement on the storage modulus of the PMMA/MAPP/C15A as compared to PMMA/PP/C15A.