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Abstract:

This study explored the influence of Maleic Anhydride-grafted Styrene Ethylene Butylene Styrene (SEBS-g-MAH) compatibilizer on the development of a novel kind of polymer blend to increase the vibration damping property of Methyl Methacrylate Acrylonitrile Butadiene Styrene (MABS) by compounding with a Styrene-based engineered elastomer (tradename VDT). Most of the research related to polymer blends has been focused on enhancing the material's stiffness, thermal or electrical conductivity by incorporating stiffer materials like glass fiber, graphene, CNT and so on. However, a limited amount of study has been done to investigate the possibility of increasing the damping property of the polymer by the use of melt compounding. Thus, a multiphase polymer blend was formulated by melt mixing in a twin screw extruder with three different weight ratios (10, 20, and 30 wt%) of VDT to enhance vibration damping with a minimum tradeoff in stiffness property. To improve the compatibility between MABS/VDT, SEBS-g-MAH was used with three different weight percentages (2, 4, and 6 wt%) and the effect of the compatibilizer was compared without it as well. The compatibility and effectiveness of the compatibilizer were investigated by studying their microstructure, tensile, dynamic mechanical analysis (DMA), differential scanning calorimetry (DSC), nuclear magnetic resonance (NMR), light optical microscopy (LOM), and scanning electron microscopy (SEM) analysis and the samples were prepared by injection molding. The damping performance has been shown to improve as the weight percent of VDT in the blends increases. It was also found that the addition of 4 wt % of SEBS-g-MAH had the highest effect on the improvement of the damping performance and tensile strength compared to the additions of 2 wt % and 6 wt % of the compatibilizer.