Preparation and Characterizations of Poly (hydroxybutyrate-co-hydroxyvalerate)/Organoclay Nanocomposites

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Abstract

This study describes the microstructure, thermal and mechanical properties of poly (hydroxybutyrate-co-hydroxyvalerate) (PHB/HV)/organoclay nanocompositesprepared through melt intercalation. Cloisite 30B, a mono tallow bis hydroxy ethyl ammonium modified montmorillonite (MMT) clay, is used. X-ray diffractometry and transmission electron microscopy (TEM) analyses clearly confirm that the intercalated microstructure is formed and finely distributed in the PHB/HV copolymer matrix, since PHB/HV has a strong hydrogen bond interaction with hydroxyl group in the organic modifier of Cloisite 30B1-3. The nanodispersed organoclay also acts a nucleating agent increasing the temperature and rate of crystallization of PHB/HV, and the thermal stability and tensile properties of organoclay based nanocomposites are enhanced. These results confirm that the organoclay nanocomposite improves the material properties of PHB/HV greatly.

Reference

1. R. A. Vaia, and E. P. Giannelis, Macromolecules (1997), 30, 8000
2. M. Kawasumi, N. Hasegawa, M. Arimitsu, and A. Okada, Marcomolecules (1997), 30, 6333
3. H. Ishida, S. Campbell, and J. Blackwell, Chem Mater (2000), 12, 1260