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Crystallization ,mechanical performance and hydrolytic degradation of Poly(butylene succinate) / graphene oxide nanocomposites obtained via in situ polymerization

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Abstract : Poly(butylene succinate) (PBS)/graphene oxide (GO) nanocomposites were fabricated via in situ polymerization with very low GO content (from 0.03 to 0.5 wt%). The microstructures of the nanocomposites were characterized with Raman spectroscopy, fourier transform infrared spectroscopy (FTIR), thermogravimetric analysis(TGA), sedimentation experiments and atomic force microscopy (AFM). The results showed that PBS chains have been successfully grafted onto GO sheets during in-situ polymerization, accompanied by the thermo-reduction from GO to graphene. The grafted GO displayed a great nucleating effect on PBS crystallization, resulting in largely improved crystallization temperature and decreased spherules size. A simultaneous enhancement in tensile strength and elongation was achieved for PBS/GO nanocomposites fiber. Meanwhile, increase in hydrolytic degradation rate was also observed for these nanohybrids. Our result indicates that using very low content GO is a simple way to achieve good dispersion yet with remarkable property enhancement for polymer/GO nanocomposites.

Keywords: A. Polymer-matrix composites (PMCs); B. Interface/interphase; B. Mechanical properties; E. Melt-spinning

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