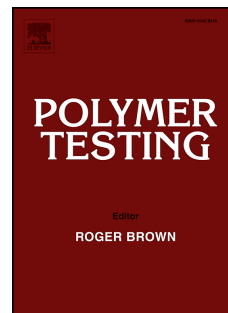


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Material Properties

Largely Improved Toughness of Poly(lactic acid) by Unique Electrospun Fiber Network Structure of Thermoplastic Polyurethane

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Abstract Oriented thermoplastic polyurethane (TPU) fiber and fiber network were first prepared by electrospinning. The as-prepared TPU fiber or fiber network was then pre-fixed in poly(lactic acid) (PLA)/TPU composite to improve the toughness of PLA. For comparison purpose, TPU/PLA composites with sea-island morphology were also prepared by traditional solution blending and mechanical blending. The results show that the toughness of PLA is greatly increased by the special pre-fixed oriented TPU fibers even at a low content, and the toughness is further increased by the TPU fiber network. Our results indicate for the first time that the toughening effect of special TPU fibers or fiber network is much better than that of traditional TPU with sea-island morphology. This study provides guidance to largely improve the toughness of PLA by designing the special phase morphology of TPU.

Key words: Mechanical properties; Poly(lactic acid); Phase morphology; Toughening; Electrospinning

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