Modifications of poly(lactic Acid) with blends and plasticization for tenacity and toughness improvement

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ABSTRACT

This review focuses on the modification of the inherent brittleness of biodegradable poly(lactic acid) (PLA) to increase its toughness, as well as recent advances in this field. The most often utilized toughening methods are melt blending, plasticization, and rubber toughening. The process of selecting a toughening scheme is still difficult, although it directly affects the blend's mechanical properties. There has been a lot of development, but there is still a long way to go before we get easily processable, totally biobased, 100% biodegradable PLA. The blends of PLA with other polymers, such as plasticizers or rubber, are often incompatible with one another, which causes the blend's individual components to behave in a manner consistent with phase separation. Polymer blending has been shown to be particularly effective in attaining high-impact strength. This review addresses the recent progress in improving the toughened PLA to gain properties necessary for the material's future engineering applications. As 3D and 4D printing becomes more accessible, PLA characteristics may be modified and treated utilizing more sophisticated production techniques.

KEYWORDS

Blend; PLA; Plasticization; Rubber; Toughness

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