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The effect of filler localization on the properties of biopolymer blends, recent advances: A review

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ABSTRACT:

In recent times, the field of biopolymer (BP) blends has been the focus of intensive fundamental and applied researches. Such BP combinations possess unique properties that are different from those of the individual components. However, most polyester polymers are thermodynamically immiscible because of their poor interactions. In the past, a third component, known as a well-defined diblock or triblock copolymer, whose chemical structure is identical to that of the main components, was usually used as a compatibilizer in order to emulsify the interfacial phase, decreasing the interfacial tension and refining the phase size. Currently, nanofillers are used to improve the phase morphologies of immiscible BP blends. The main advantage of using nanofillers, when compared to copolymers, is that the former can simultaneously act as nano-reinforcements and compatibilizers. In this review, the addition of nanofillers as the third component in the BP blend systems are reported in relation to their morphologies, barrier properties, shape memory, thermal, and mechanical properties. The effects of selectively localized nanofillers on the properties of the BP blends are also explored, with the aim of establishing the relationships between the localization of the fillers and the overall properties of the BP blends. Furthermore, the effect of the processing techniques on the localization of the nanofillers/BP blend is also reported. The review article discusses recent progress from 2014 up to 2019 on filler localization of BP blend nanocomposites.