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Preparation and Properties of Novel Flame-retardant PBS Wood-plastic Composites

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Abstract: Poly (butylene succinate) (PBS), as a fully biodegradable thermoplastic, have developed rapidly due to its integrated performance and processibility. The CaCO_3 as a reinforcing component, and AHP, APP and CaHP as a flame-retardant component were separately incorporated into PBS matrix. A series of PBS-based composites were fabricated via melting blending using internal mixer followed by injection molding. The results show that the different filling ratio has a certain influence on the mechanical properties of the composites. When the filling amount of wood powder is 40 copies, the composite mechanical properties of the composite is better. CaCO_3 addition, the composite material of the bending strength, tensile strength have improved significantly. The results showed that small amount of AHP, APP and CaHP improved the tensile strength of PBS composites, however, the tensile strength decreased as further increase amount of AHP, APP and CaHP. Cone Calorimeter testing revealed that, the combination of AHP, APP and CaHP could significantly reduce the pHRR and the total heat release (THR) of the composites. TGA test indicated that the addition of AHP, APP and CaHP could significantly increase the char residue and reduce the mass loss rate. TGA test indicated that the addition of AHP, APP and CaHP could significantly increase the char residue and reduce the mass loss rate. Through the research of mechanical and thermal properties of PBS composite, it could lay a foundation of the application of PBS composite in different fields.

KEYWORDS Poly (butylene succinate); Crystallization behavior; Flame retardant; AHP; APP; CaHP;

1. Introduction

Facing the coming energy crisis, the world recognized the need to adopt expenditure strategy, on the one hand, energy saving, on the other hand, the development of new energy. In the case of the petrochemical industry, we must find a new way for the synthesis of polymer materials, in order to reduce dependence on oil and other nonrenewable resources. On the other hand, with the development of the times, the shortage of natural wood has become one of the important problems facing the world today. Governments

are working to protect natural resources and strengthening the implementation of forest protection laws. In particular, the rapid development of living conditions, environmental awareness gradually increased.

Plastic was once known as the 20th century's most significant invention, It has been widely used in many fields because of its many excellent performances. The application of plastic products brings great convenience to people, but also brings serious negative effects. Most of the abandoned plastic product, except in the special conditions can be solved. Waste plastics in the natural environment of

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