



**EFFECT OF ORGANIC MONTMORILLONITE, TALC AND FUMED SILICA FILLERS ON THE MECHANICAL PROPERTIES AND THERMAL PROPERTIES OF POLYLACTIDE COMPOSITES**

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Effect of Organic montmorillonite, Talc and Fumed Silica Fillers on the Mechanical Properties and Thermal Properties of Polylactide Composites Fengmei Yu, Tao Liu, Xiuli Zhao, Jianhua Wang Institute of Chemical Materials , China Academy of Engineering Physics , Mianyang 621900 , China Abstract? Polylactide?PLA? is thought as the most promising biodegradable polymer because it is made from renewable agricultural products such as corn and is readily biodegradable. However, some properties such as toughness, strength and thermostability are not good enough for end use. Preparing composites by compounding polymer with fillers has already proven to be an effective way to improve properties of polymer and reduce the production costs. To compare the effect of different fillers on properties of PLA, three kinds of organic montmorillonite, two sizes of Talc and one of fumed silica were compounded with PLA with a twin-screw extruder. The composites were injection molded, and the mechanical properties and thermal properties of PLA composites filled with different fillers were investigated. The results showed that the mechanical properties of PLA composites filled with organic montmorillonite was not visibly enhanced, but the tensile strength and flexure strength of PLA composites with 3wt% talc and SiO<sub>2</sub> fillers were significantly higher than those of pure PLA. Furthermore, it was observed that talc had obviously toughening effect to improve the impact strength of PLA. The effect of different fillers on the crystallization behavior was studied with differential scanning calorimetry, it was determined that the talc have the most obvious nucleation effect, followed by SiO<sub>2</sub> and MMT. It was concluded from GPC and rheology measurement data that processing made the molecular weight of PLA decrease due to thermal oxidative degradation. This work has been supported by Science & technology foundation of China Academy of Engineering Physics (2008A0302012)