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## Bronsted acidic ionic liquids: New transesterification agents for the compatibilization of Polylactide/Ethylene-co-vinyl acetate blends

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### Abstract:

Sulfonic acidic ionic liquids (ILs) based on imidazolium or triphenylphosphonium cations were synthesized and used as new transesterification agents to compatibilize partially bio-based thermoplastic blends composed of polylactide (PLA) and ethylene-co-vinyl acetate (EVA) copolymer containing 18% of VA. The influence of these Bronsted acidic ionic liquids (BAIL) as catalysts was investigated and compared with conventional catalyst such as titanium tetrabutoxide ( $\text{Ti}(\text{BuO})_4$ ). In all cases, the presence of the sulfonic acidic ionic liquids resulted in an increase of the torque during the processing of the polymer blends, suggesting the transesterification reaction, which was confirmed by Fourier transform infrared spectroscopy (FTIR). Moreover, the degradation of PLA chain was minimized by the presence of ILs, whereas  $\text{Ti}(\text{BuO})_4$  promoted a decrease of molar mass of the PLA component and a decrease of the torque. Thus, the influence of the transesterification on the final properties such as the thermal degradation as well as the thermomechanical and mechanical properties has been studied. The highest efficiency of the blend compatibilization was achieved by using only 1 wt% of IL denoted triphenylphosphonium butyl sulfonic acid chloride [TPP- $\text{bSO}_3\text{H.Cl}$ ]. Indeed, the SEM micrograph of this blend was more uniform with EVA particles well adhered to the PLA matrix.

**Keywords:** polymer blends; ethylene vinyl acetate; polylactide; compatibilization; ionic liquid; transesterification.

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