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Immiscible polymer ternary blends – Control of the morphology

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Abstract:

The objective of this work was to improve impact properties of polylactide (PLA) by mimicking the morphology of high impact polystyrene (HIPS). Obtaining the target morphology (micron size sub-inclusions of a first phase imbedded in inclusions of a second phase dispersed in the PLA matrix) implies to be able to control the location of each phase and the size of inclusions and sub-inclusions.

The spatial relative location of the phases is driven by thermodynamics [1-2] thus by the interfacial tensions. The size of inclusions and sub-inclusions is controlled in immiscible binary blends by the volume fraction, the Capillary number and the viscosity ratio between the phases. Models used to predict the morphology and the strategy developed in order to reach the target morphology will be presented.

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References:

1. S.Y. Hobbs, M.E.J. Dekkers and V.H. Watkins, *Polymer* 1988, vol.29, p1598
2. P. Le Coroller, B D. Favis, *Polymer* 2011, vol. 52, p3827



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Short abstract for the book of abstracts:

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This work aimed at mimicking high impact polystyrene morphology (core-shell inclusions in PS) in a polylactide by melt blending. This implies to control the spatial relative location of the polymers and the size of inclusions and sub-inclusions. Models used to predict the morphology and the strategy developed in order to reach the target morphology will be presented.