



## PREPARATION AND CHARACTERIZATION OF POLYHYDROXYALKANOATES (PHA) AND POLYLACTIDE (PLA) BLENDS

T. Gérard<sup>a,\*</sup>, T. Budtova<sup>a</sup>

<sup>a</sup> Mines ParisTech, Centre de Mise en Forme des Matériaux (CEMEF), CNRS UMR 7635, BP 207, 1 rue Claude Daunesse,  
06904 Sophia Antipolis Cedex

\*Corresponding author: [thibaut.gerard@mines-paristech.fr](mailto:thibaut.gerard@mines-paristech.fr)

Due to the rarefaction of fossil resources and the awareness of the necessity of reducing our footprint on the planet, there is a growing interest for materials made from renewable resources. Among them, the biomass-based polyesters such as PHA and PLA start to be seriously considered for the replacement of petrochemical based polymers. Polyhydroxyalkanoates are polyesters directly produced by numerous microorganisms by bacterial fermentation of sugars or lipids. Polylactide is produced by a biotechnological way: it is synthesized from lactic acid, which is obtained from renewable resources such as corn starch or maize.

In the present research work, the blends of a poly(hydroxybutyrate-co-hydroxyvalerate) (PHBV) and a polylactide are studied. They were prepared by melt-mixing of the initial polymers in various proportions. The main goal is to correlate blend morphology, flow and mechanical properties.

The miscibility of the two components was first characterized by differential scanning calorimetry (DSC) experiments, which showed the immiscibility of the components for all compositions. The rheology of the pure polymers and of the blends was investigated in the dynamic mode. The results showed a very important role of the interfaces, with an increase of the complex viscosity at small frequencies. The different morphologies observed by scanning electron microscopy (nodular or co-continuous) were correlated with the rheological results. Finally, the mechanical properties of the blends were studied and related to the composition of the blends. The influence of a commercial compatibilizer on the final properties of the material was also investigated.