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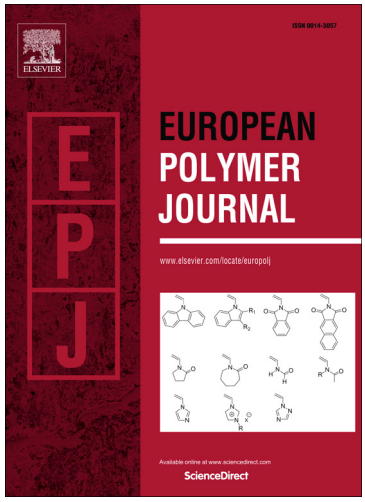

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PII: S0014-3057(17)30188-X
DOI: http://dx.doi.org/10.1016/j.eurpolymj.2017.03.031
Reference: EPJ 7780

To appear in: *European Polymer Journal*

Received Date: 1 February 2017
Revised Date: 8 March 2017
Accepted Date: 12 March 2017

Please cite this article as: Nofar, M., Tabatabaei, A., Sojoudiasli, H., Park, C.B., Carreau, P.J., Heuzey, M.-C., Kamal, M.R., Mechanical and bead foaming behavior of PLA-PBAT and PLA-PBSA blends with different morphologies, *European Polymer Journal* (2017), doi: http://dx.doi.org/10.1016/j.eurpolymj.2017.03.031

Mechanical and bead foaming behavior of PLA-PBAT and PLA-PBSA blends with different morphologies

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Abstract

Blends of 75 wt% amorphous polylactide (PLA) with 25 wt% poly[(butylene adipate)-co-terephthalate] (PBAT) and poly[(butylene succinate)-co-adipate] (PBSA) were prepared. The effects of PLA molecular weight and of two different mixing processes (i.e., internal mixer and twin-screw extruder) on the blend properties were investigated. The crystallization behavior, rheological properties, and morphology of these blends and neat polymers were firstly examined. The tensile properties and bead foaming behavior of the neat and blend systems were then investigated. Various blend morphologies could be obtained by using different molecular weight PLAs as well as different processing techniques. The tensile properties of the blends were significantly affected by the droplet size and PLA matrix molecular weight. Different microcellular bead foam structures ranging from low-density open-cell to high-density closed-cell were manufactured by using blends with different droplet morphologies as well as by using minor phase solid inclusions with different rigidities originated from different crystallization behavior.