

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Confined crystallization in compatibilized Polyamide 6/High Density Polyethylene blends SIMONA CEC-
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— Blending polymers can be considered the easiest way to obtain new materials with tuned properties thanks to the possibility to control blend morphologies. The blend characteristics depend on the properties of each component, on composition and on morphologies developed during polymers processing. In case of semi-crystalline blended polymers, mechanical performances are closely related to the crystalline morphology. Therefore, it is essential that crystallinity is maintained after blending in order to keep or enhance the properties. This may be a challenge when the blends exhibit multiphase morphologies with sub-micrometer domain sizes. In this work, we study the crystallization behavior of compatibilized Polyamide 6/High Density Polyethylene (PA6/PE) blends by means of the Differential Scanning Calorimetry technique. Blends with various morphologies (dispersed, stretched dispersed, fibrillar and co-continuous) are obtained by reactive extrusion and varying blend composition and processing parameters. Blend composition and morphology turn out to greatly affect the bulk crystallization temperatures of both PA6 and PE. When the polymer is confined in domains of a few micrometers the crystallization temperature peak shifts to lower temperatures. Thus, the smaller the domain size the lower the crystallization temperature in case of dispersed morphologies. Moreover, in multi-scale morphologies showing polymer droplets in the nanometer range, fractionated crystallization (multiple crystallization peaks) is observed.

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Date submitted: 04 Nov 2011

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