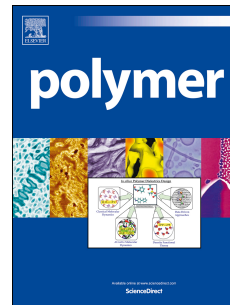


Accepted Manuscript

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PII: S0032-3861(15)30012-4

DOI: [10.1016/j.polymer.2015.05.051](https://doi.org/10.1016/j.polymer.2015.05.051)

Reference: JPOL 17889

To appear in: *Polymer*

Received Date: 12 March 2015

Revised Date: 10 May 2015

Accepted Date: 28 May 2015

Please cite this article as: Rahman MA, Andrade R, Maia J, Baer E, Viscosity Contrast Effects on the Structure – Property Relationship of Multilayer Soft Film/Foams, *Polymer* (2015), doi: 10.1016/j.polymer.2015.05.051.

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ABSTRACT

In this research work, multilayer soft film/foam systems based on low-density polyethylene (LDPE) have been developed. In order to improve the layer stability during processing, a viscosity contrast between film and foam layer polymers is maintained. Three different LDPE grades having different melt flow indices were used and film/foam systems with up to 32 layers were produced. High-viscosity film layer and low-viscosity foam layer in each film/foam system contributed to good layer integrity even with high foam content. Measurements of cell density and cell size distribution indicated that high viscosity film layer and increasing layer number have significant confinement effect that enhanced the cell nucleation and suppressed the cell coalescence and thus contributed to single cell arrays in foam layers. Constrained cell growth was observed in 16 and 32 layers film/foam systems. Confinement effect from the high viscosity film layer was also observed at higher foam content. In addition, uniform layer integrity resulted from high viscosity contrast between film and foam layers contributed to higher deformability. Moreover, increasing layer number also improved the tensile modulus and strength of each film/foam system.

Keywords: Multilayer coextrusion, soft film/foam, low-density polyethylene, viscosity contrast.

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