OP-Carreau-101

Wednsday, May 11, 2011, 11:10-11:30 am
Room: Karam 4

EFFECT OF NANOCLAY ON THE CELLULAR AND CRYSTALLIZATION MORPHOLOGIES OF PLA DURING EXTRUSION FOAMING

Zhai, W.T.[a,b], and Park, C.B.[b,*]

[a] Ningbo Institute of Material Technology and Engineering (NIMTE), Chinese Academy of Sciences, Ningbo, Zhejinag province, 315211, China and [b] Microcellular Plastics Manufacturing Laboratory, Department of Mechanical and Industrial Engineering, University of Toronto, Toronto, Ontario, M5S 3G8

Crystallization is an important process that occurs in polymer materials and controls the polymer's structural formation. Thus, it strongly influences the final product's properties. In batch foaming, the effect of crystal domains on cell nucleation during polymeric foaming has attracted wide research attention. These studies have verified that the presence of fine-sized crystals could dramatically improve the cell morphologies of foams. In continuous extrusion foaming, however, the effect of crystal domains have usually been ignored due to the difficulties in investigating the polymer melt's crystallization behavior within the die during extrusion. This study explores the possibility of crystallization occurring within the die during extrusion foaming, and presents the effect of crystal domains on cell nucleation. In addition, a hypothesis about the effect of crystal domains on cell nucleation is proposed in the study based on our past study. The present study offers a novel perspective from which to understand the interesting and unexpected foaming results found in semi-crystalline polymer extrusion foaming.