

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Photopolymerization Induced Directional Crystal Growth in Polymer and Photo Reactive Mixtures¹ SOO JEOUNG PARK, THEIN KYU, University of Akron — Photopolymerization induced crystallization has been demonstrated experimentally in blends of polyethylene oxide (PEO)/diacrylate (DA) at temperatures above the depressed melting temperature of PEO crystals. Upon blending with a multifunctional photo reactive monomer, the melting temperature of the crystalline polymer is depressed due to miscibility or partial miscibility of the system. When photopolymerization was carried out in an isotropic melt state of the PEO/DA monomer mixture by exposing it to UV irradiation, the melting transition curve moves upward and eventually surpasses the reaction temperature, thereby inducing phase separation as well as crystallization. The present paper is the first to demonstrate the occurrence of various directionally solidified interface morphologies of polymer crystals subjected to a photo-intensity gradient. The epitaxially grown seaweed or degenerate structures were observed at the circumference (low intensity region) while the dense branched spherulites developed at the core (high intensity region). These interface structures exhibit striking resemblance to the microstructures formed by directional solidification of small molecule systems such as metal alloys or organic crystals subjected to external thermal gradient.

¹Supported by NSF-DMR0514942.

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Date submitted: 15 Nov 2006

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