Morphological Evolution of Poly (caprolactone) Dendrites during Isobaric Relaxation of Metastable Monolayers at the Air/Water Interface

BINGBING LI, ALAN ESKER, DEPARTMENT OF CHEMISTRY (0212), VIRGINIA TECH, BLACKSBURG, VA 24061 TEAM — Isobaric crystallization at constant surface pressures of 11, 10.5, 10.3, 10, 9.5, and 8.5 mN/m were performed for a poly (caprolactone) (PCL)/poly (t-butyl acrylate) (PtBA) blend with a PtBA mole fraction of 0.14 to study the effect of surface pressure on the morphological evolution of PCL dendrites at the air/water interface. At 11 mN/m, corresponding to a higher degree of undercooling, morphological studies indicate that the side-branches in the two (100) sectors grow faster than those in the four (110) sectors, possibly because molecular diffusion effects arising from a limited material reservoir is more spatially constrained in the (110) sectors. During isobaric crystallization at 10.3 and 10 mN/m, four-arm dendrites observed show side-branches in the four (110) growth faces are better developed. Furthermore, isobaric crystallization at 9.5 mN/m causes a seaweedlike crystal morphology showing less branched and more compact structures with larger tip radii. Finally, PCL crystals grown at 8.5 mN/m show compact structures without side-branches.

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Date submitted: 17 Nov 2006