

CRYSTALLIZATION OF SHEARED POLYMER SYSTEM

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Notwithstanding its paramount relevance in dictating the ultimate properties, crystallization of polymeric materials in actual processing conditions still has many obscure facets, both because of the intrinsic compositional complexity of the materials and because of the complex set of external conditions in which solidification of the fluid streams take place. In recent years we have been engaged in experiments aimed at providing phenomenological correlations between thermo-mechanical history and kinetics of crystallization and at obtaining information on the nature of the nucleation precursors which are generated in the system submitted to well defined flow histories. Several different experimental approaches have been used to investigate polymer crystallization: from the simple and direct observation of the morphology at optical microscopy level to the time-resolved X-rays and light scattering.

In this presentation, the main results will be described and explained on the basis of a model that includes competition between formation and disappearance of crystal nucleation precursors under the effect of shear flow. The results of a recent investigation on a system containing nucleating agents will prove the consistency of the model