

Abstract Submitted
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Flow-induced Crystallization of Long Chain Aliphatic Polyamides under a Complex Flow Field¹ XIA DONG, YUNYUN GAO, LILI WANG, DUJIN WANG, Beijing National Laboratory for Molecular Sciences, CAS Key Laboratory of Engineering Plastics, Institute of Chemistry CAS — The present work deals with the flow-induced multiple orientations and crystallization structure of polymer melts under a complex flow field. This complex flow field is characteristic of the consistent coupling of extensional pulse and closely followed shear flow in a narrow channel. Utilizing an ingenious combination of an advanced micro-injection device and long chain aliphatic polyamides, the flow-induced crystallization morphology was well preserved for ex-situ synchrotron micro-focused wide angle X-ray scattering as well as small angle X-ray scattering. The experimental results clearly indicate that the effect of extensional pulse on the polymer melt is restrained and further diminished due to either the transverse tumble of fountain flow or the rapid retraction of stretched high molecular weight tails. However, the residual shish-kebab structures in the core layer of the far-end of channel suggest that the effect of extensional pulse should be considered in the small-scaled geometries or under the high strain rate condition.

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