

SIMULTANEOUS OPTICAL AND X-RAY SCATTERING MEASUREMENTS TO STUDY PRECURSORS OF SHEAR-INDUCED CRYSTALLIZATION OF POLYPROPYLENE.

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Abstract

An experimental set up is presented combining simultaneous optical and X-ray scattering measurements with a short term shearing apparatus to study flow-induced crystallization of polymers. Oriented precursors are at the heart of the large effects that flow produces on polymer crystallization. The sensitivity of rheo-optics enables the detection of the dilute shear-induced precursors as they form during shear when still X-ray techniques are unable to reveal them. However, the impact of the oriented precursors on subsequent morphology development after cessation of flow can be quantified with X-ray scattering. Using simultaneous techniques allows correlation between the events that occur during and after flow even with large sensitivity of flow-induced crystallization to small changes in applied conditions.