

Abstract Submitted  
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**Early Stages in Polymer Crystal Growth for Isotactic Poly-1-Butene: From Nucleation to Network Percolation** DEEPAK ARORA, HORST WINTER, University of Massachusetts Amherst — Isothermal crystallization experiments on isotactic poly-1-butene at early stages of spherulite growth provide quantitative information about nucleation density, volume fraction of spherulites and their crystallinity, and the mechanism of connecting into a sample spanning structure. An attempt is made to connect the crystal fraction inside spherulites with the average crystallinity of the entire sample. The crystal fraction inside spherulites is very small initially but increases with time and catches up with the sample crystallinity later on. Experiments include optical microscopy, DSC, SALS, and rheology. Optical microscopy near the fluid-to-solid transition suggests that the transition, as determined by rheology, is not caused by packing/jamming of spherulites but by the formation of a percolating structure. Impingement of pairs of spherulites occurs already much before percolation. This makes it difficult to predict crystal growth and define spherulitic impingement for the whole sample. At percolation, the absolute crystallinity is about 7-8 vol%. This shows that spherulites are mostly amorphous before impingement.

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