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AFM Study of the Beta to Alpha Transition in Isotactic Polypropylene JEROLD SCHULTZ, University of Delaware, HUIHUI LI, XIAOLI SUN, SHOUKE YAN, State Key Laboratory for Polymer Physics and Chemistry, Chinese Academy of Sciences, Beijing — β -iPP cylindrites were produced by introducing an iPP fiber into the iPP melt at about 175 °C, followed by crystallization in the range 100 ~ 140 °C. Before β -phase crystallization has completed, the material is upquenched above 140 °C and crystallization allowed to continue isothermally in the α -phase. Following the completion of crystallization, morphological details of the $\beta \rightarrow \alpha$ interfacial region have been studied by means of PLM and SEM. Through SEM observation, there are two seemingly different transformation morphologies, i.e., a fan-shaped transition, and a profuse transformation. They in fact arise from a single phenomenon, i.e., the development of multitudinous fingers at the growth face of multilayer β -lamellae. When viewed from different directions, one observes either α -fans or the profuse initiation of α crystals in the transition region. Further, the fingerlike lathes are found to be curled cylindrically. It is suggested that the shrinkage deriving from the change in chain packing is causal for the fingering phenomenon, and a simple mechanism is presented to illustrate the curling phenomenon of the α crystals.

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