

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Structure Formation of Spinning Polymer Fibers Studied by Monte Carlo Simulations¹ WENBING HU², QI LIU, Nanjing University — We performed dynamic Monte Carlo simulations of lattice polymer solutions to investigate the solidification process in a fluid filament after extruded from a spinneret into a coagulation bath. We observed skin-core structure formation under the interplay of phase separation and polymer crystallization. We found that a radial temperature gradient dominates the formation of a highly oriented solid skin, while a radial influx of non-solvent dominates the formation of a concentrated core. The processing parameters can adjust and even eliminate the skin-core structure in the fibers. Our molecular-level observations facilitate a better understanding of the fiber processing for the industry to make high quality fibers.

¹The financial support of National Natural Science Foundation of China (Grant No. 20825415 and 21274061) and the National Basic Research Program of China (Grant No. 2011CB606100) is appreciated.

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Date submitted: 06 Oct 2013

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