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A Fast Scanning Calorimetric Comparison Study of Crystallization Behavior between Semi-crystalline Polymers and Liquid Crystals¹ DONGSHAN ZHOU, JING JIANG, LAI WEI, ZHIJIE HUANG, GI XUE, Nanjing University — Mesomorphic state with similar liquid crystal order was found to precede the crystallization in many polymers, so the study of nucleation and crystallization from a liquid crystal can provide reference for the study of polymers. The same procedure to study the nucleation and crystallization of semi-crystalline polymers was used to study 4-cyano-4'-octyloxy biphenyl-carbonitrile (80CB). Different from metastable semi-crystalline polymers of multi-folded chains, whose melting temperature was basically continuously dependent on the crystallization temperature, melting temperature of 80CB should have definite values, corresponding to disordering of four different polymorphism modifications at 309.0 K, 319.0 K, 325.0 K, and 327.0K, respectively. But, a lower temperature melting peak below 300K was found when 80CB was annealed at temperature below 250K. More importantly, the peak temperature shifted positively with the increasing annealing temperature, just the same as that of semi-crystalline polymers. At the moment, we were not sure about the structure of the metamorphism and why small molecular liquid crystal showed similar melting behavior that was thought only inherited to chain like semi-crystalline polymers.

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