

Supporting Information for

Effect of Flowing Preformed Spherulites on Shear-Induced Melt Crystallization Behaviors of Isotactic Polypropylene

Junyang Wang, Xuehui Wang, Qiaojiao Wang, Cui Xu and Zhigang Wang*

CAS Key Laboratory of Soft Matter Chemistry, Department of Polymer Science and Engineering, Hefei National Laboratory for Physical Sciences at the Microscale, University of Science and Technology of China, Hefei, Anhui 230026, P. R. China

*To whom correspondence should be addressed. E-mail: zgwang2@ustc.edu.cn

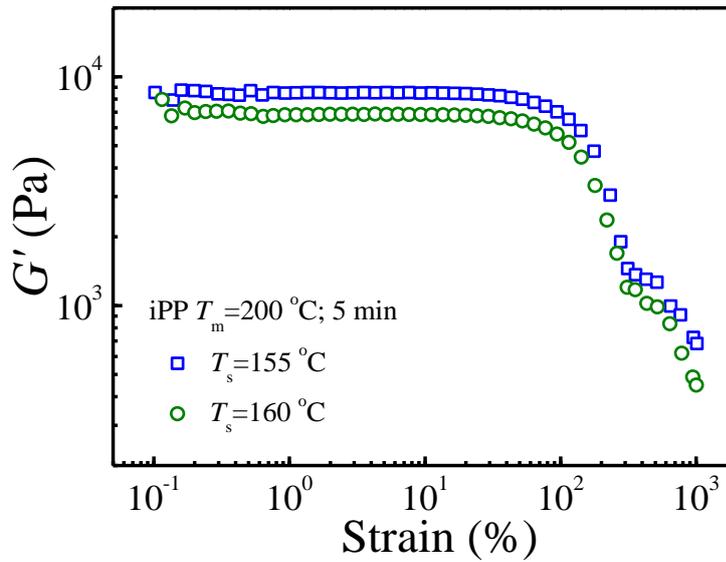


Figure S1. Changes of storage modulus, G' , during strain sweeps at the fixed frequency of 1.0 rad/s and different T_s 's for iPP films. The iPP films were melted at $T_m=200$ °C for 5 min prior to the strain sweeps at T_s 's.

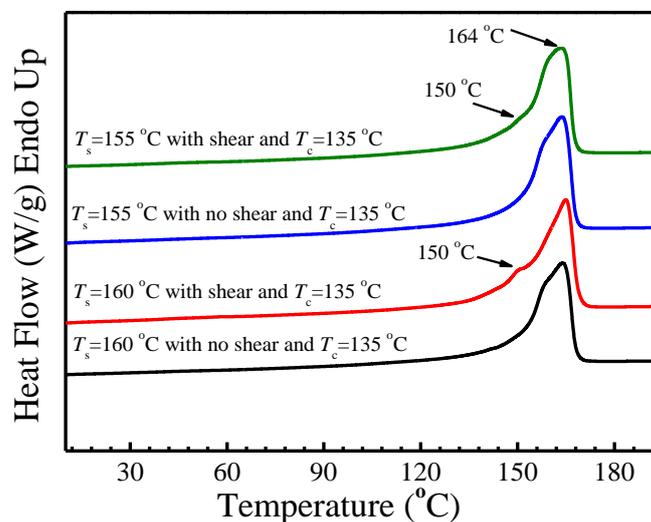


Figure S2. DSC heat flow curves of the iPP films taken off from the Linkam optical shearing system after experiencing different shear crystallization treatments. The DSC heating rate was 10 °C/min. All iPP films had preformed spherulites, which were prepared by crystallization at $T_h=130$ °C for 1 min. Shear was applied at T_s at a shear

rate $\dot{\gamma} = 10 \text{ s}^{-1}$ for $t_s = 5 \text{ s}$. If shear was not applied, the iPP films were held at T_s for 1 min. And then the iPP films were quenched to $T_c = 135 \text{ }^\circ\text{C}$ for crystallization time of 10 min. All the iPP films were cooled to room temperature at a cooling rate of $30 \text{ }^\circ\text{C}/\text{min}$ in the Linkam optical shearing system prior to taking the DSC measurements.

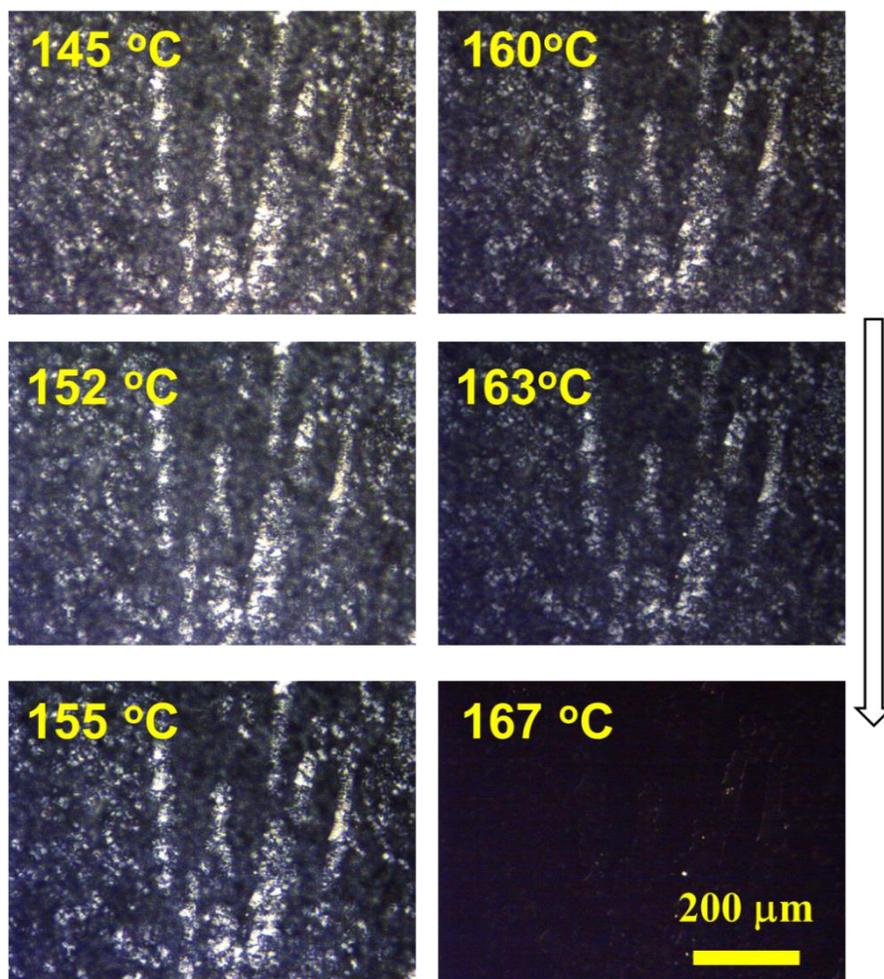


Figure S3. Selected POM micrographs at different temperatures during heating for shear-induced crystallized iPP film. The iPP film crystallized at $T_c = 135 \text{ }^\circ\text{C}$ with preformed spherulites and shearing at shear rate $\dot{\gamma} = 10 \text{ s}^{-1}$ for $t_s = 5 \text{ s}$ at $T_s = 155 \text{ }^\circ\text{C}$. The scale bar represents $200 \text{ } \mu\text{m}$ and is applied to other micrographs. The arrow on the right indicates the shear direction and this note is applicable to all other figures.

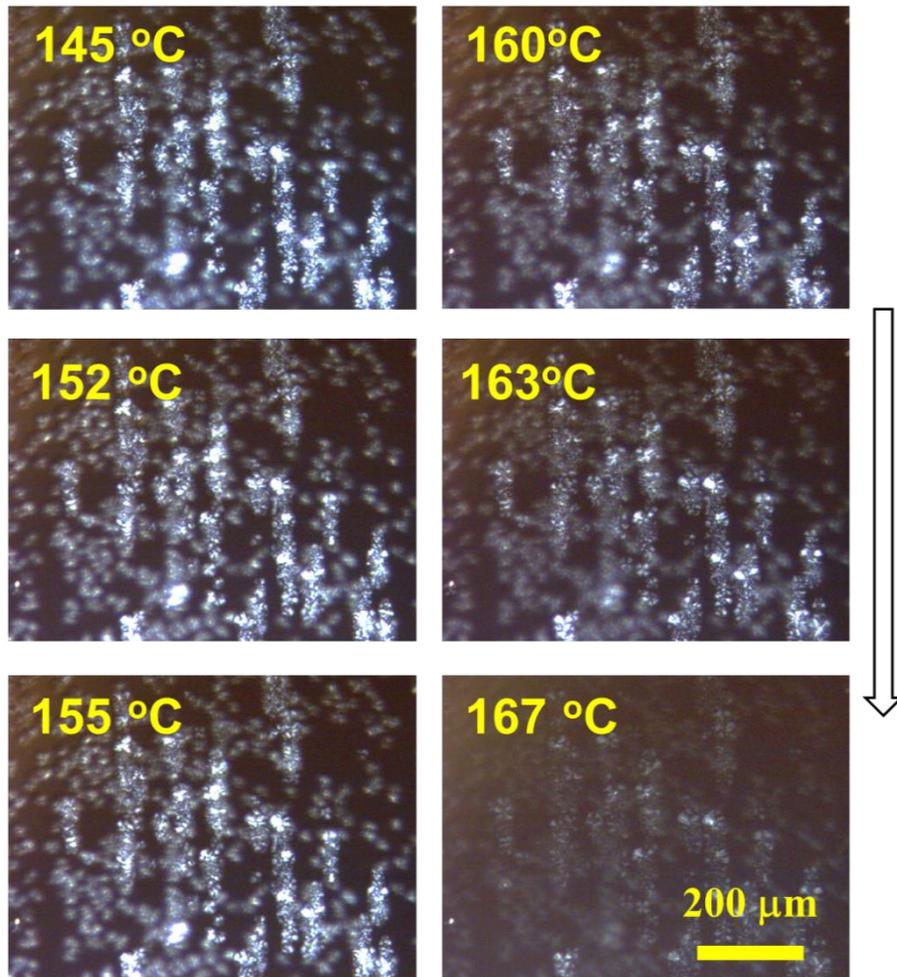


Figure S4. Selected POM micrographs at different temperatures during heating for shear-induced crystallized iPP film. The iPP film crystallized at $T_c=135$ °C with preformed spherulites and shearing at shear rate $\dot{\gamma}=10$ s⁻¹ for $t_s=5$ s at $T_s=160$ °C. The scale bar represents 200 μm and is applied to other micrographs.