

**Supporting Information for**

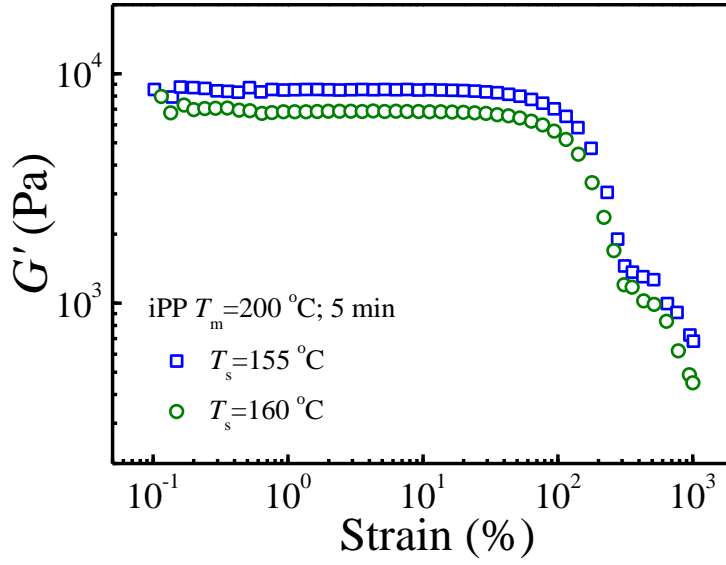
**Effect of Flowing Preformed Spherulites on Shear-Induced Melt**

**Crystallization Behaviors of Isotactic Polypropylene**

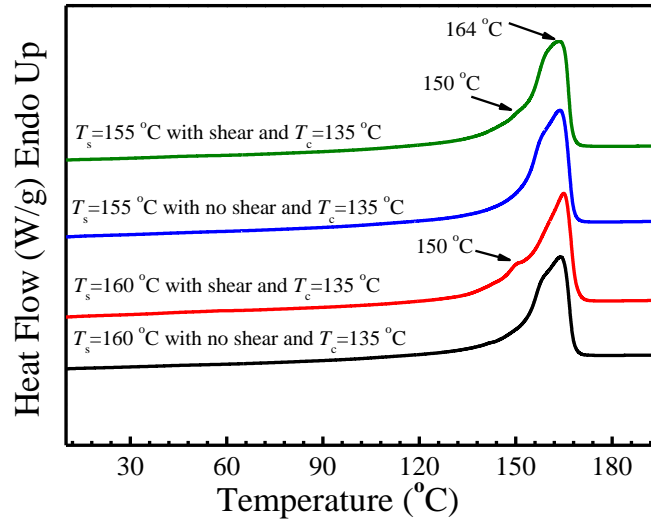
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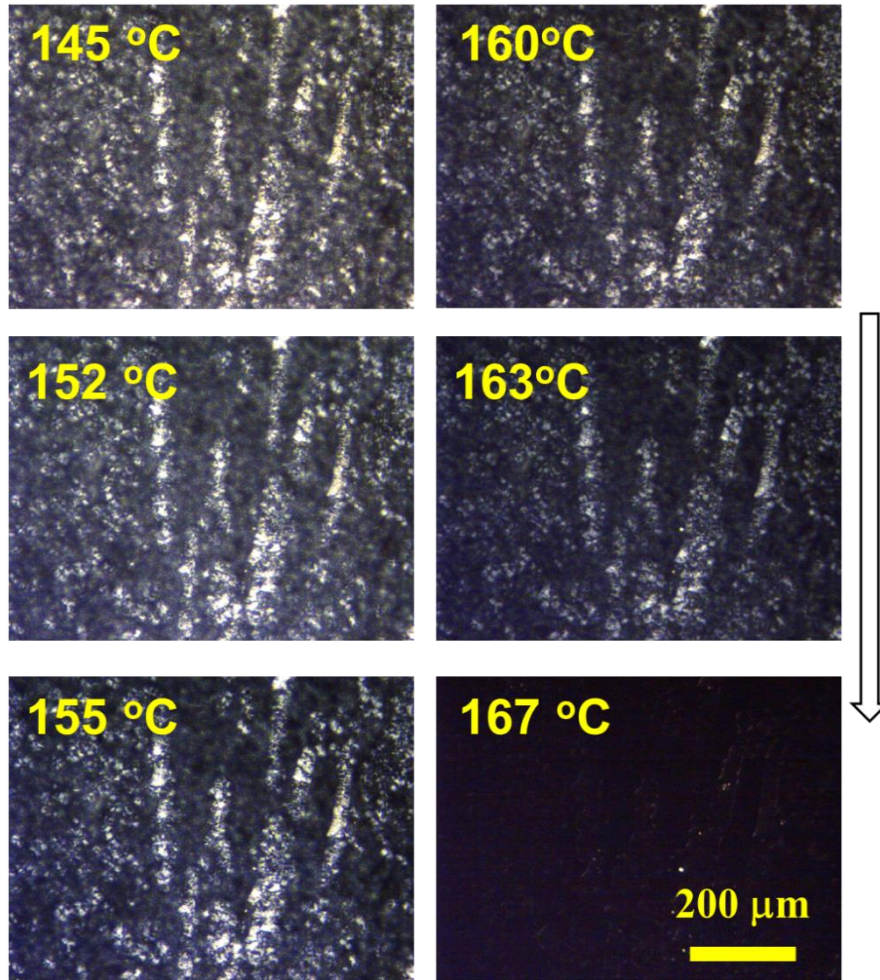


**Figure S1.** Changes of storage modulus,  $G'$ , during strain sweeps at the fixed frequency of 1.0 rad/s and different  $T_s$ 's for iPP films. The iPP films were melted at  $T_m=200$  °C for 5 min prior to the strain sweeps at  $T_s$ 's.

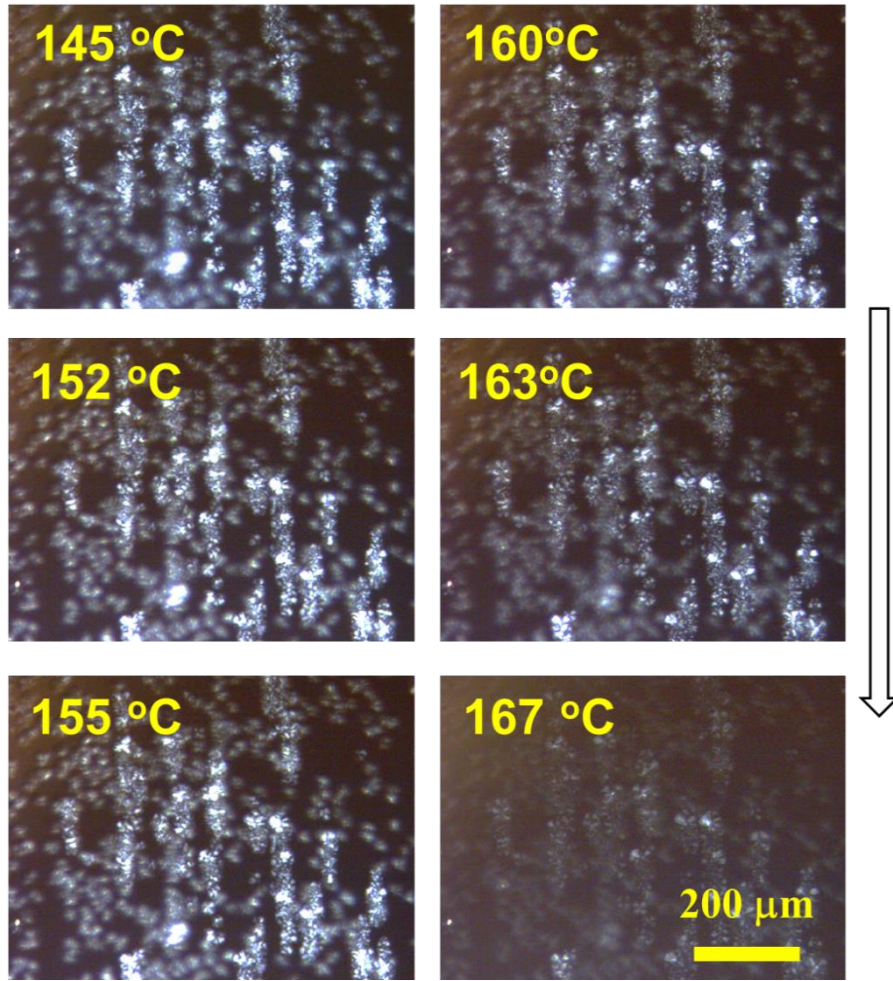


**Figure S2.** DSC heat flow curves of the iPP films taken off from the Linkam optical shearing system after experiencing different shear crystallization treatments. The DSC heating rate was 10 °C/min. All iPP films had preformed spherulites, which were prepared by crystallization at  $T_h=130$  °C for 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<sup>-1</sup> for  $t_s=5$  s at  $T_s=160$  °C. The scale bar represents 200 μm and is applied to other micrographs.