

Supporting Information

Self-nucleation (SN) tests by using differential scanning calorimetry (DSC)

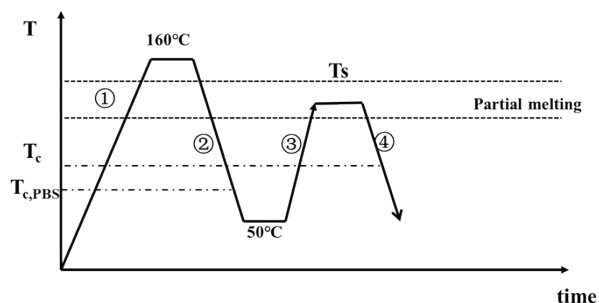


Figure S1. The procedures of SN tests by using DSC.

The total thermal treatment is mainly divided into four steps¹, such as shown in Figure S1. Step ①: the samples were first heated to 160 °C and held at 160 °C for 3 min to erase the thermal history. Step ②: the samples were cooled to 50 °C. The peak temperature of the exotherm was taken as $T_{c,PBS}$. Step ③: a crucial step in the analysis process, which is carried by heating the samples to selected temperature (T_s) for 3 min. The qualified T_s needs to meet certain condition: high enough to make PBS partly melt and low enough to make PBS form some stabilized crystal fragments to induce self-nucleation without annealing. Step ④: the final crystallization was cooled to 50 °C and the crystallization peak was taken as T_c . During the whole procedure, the heating rate and the cooling rate were both 10 °C /min and the sample was protected under a nitrogen atmosphere.

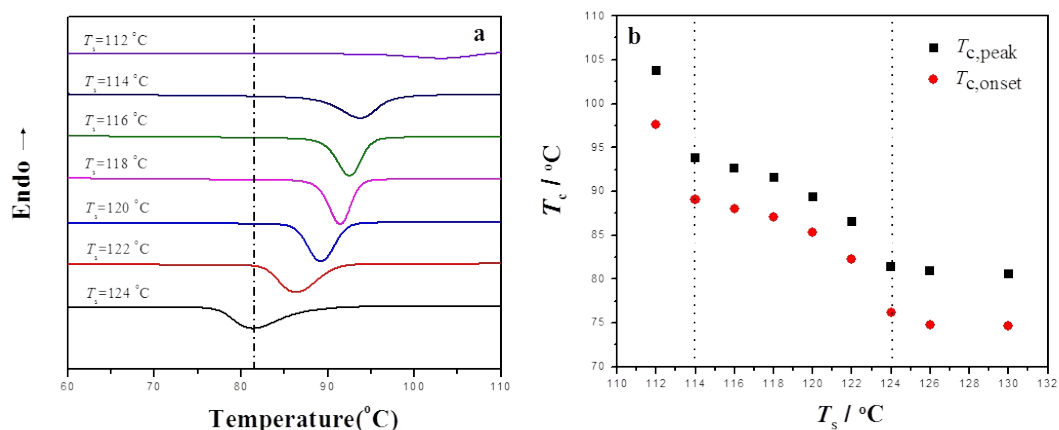


Figure S2. (a) Self-nucleation behavior of neat PBS to select the lowest T_s . (b) Variation of the T_c with T_s for PBS. The dashed lines correspond to changes in the self-nucleation domains.

Figure S2(a) shows the cooling curves of the neat PBS by using different T_s . When T_s is higher than 124 °C, the sample is completely melted and the obtained T_c is constant. When T_s is between 112 °C and 124 °C, an increased T_c can be obtained with the increase of T_s , indicating the improvement of the nucleation density of PBS. The ideal self-nucleation temperature is defined as the lowest T_s which can cause the maximum shift of T_c ². Figure S2(b) can be verified more clearly in the plot of the T_c versus T_s . For neat PBS here, the lowest T_s is selected as 114 °C, the $T_{c,max}$ value is obtained as 93.8 °C.

References

1. B. Fillon, A. Thierry, B. Lotz and J. C. Wittmann, *J. Therm. Anal.*, 1994, **42**, 721-731.
2. M. Trujillo, M. L. Arnal, A. J. Muller, M. A. Mujica, C. U. de Navarro, B. Ruelle and P. Dubois, *Polymer*, 2012, **53**, 832-841.

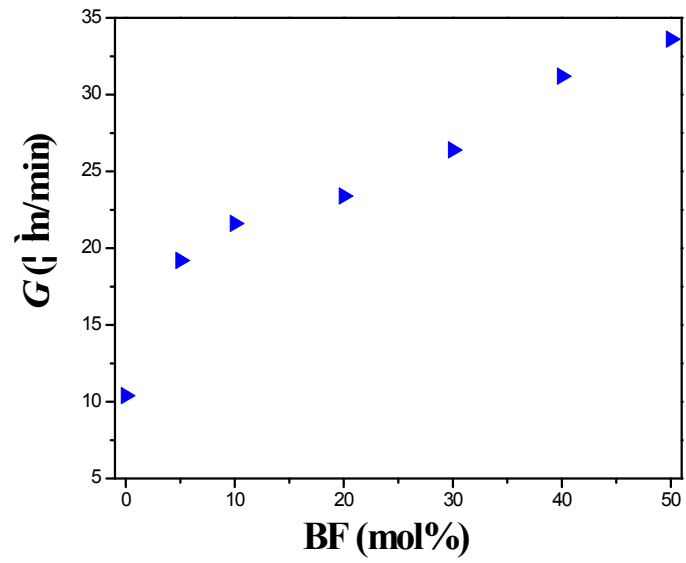


Figure S3. Spherulitic growth rates of PBSFs with different BF molar ratios isothermally crystallized at 96 °C.