Electronic Supplementary Material (ESI) for Polymer Chemistry.

A high-molecular-weight and high-T_g poly(ester carbonate) partially based on isosorbide: Synthesis and structure-property relationships

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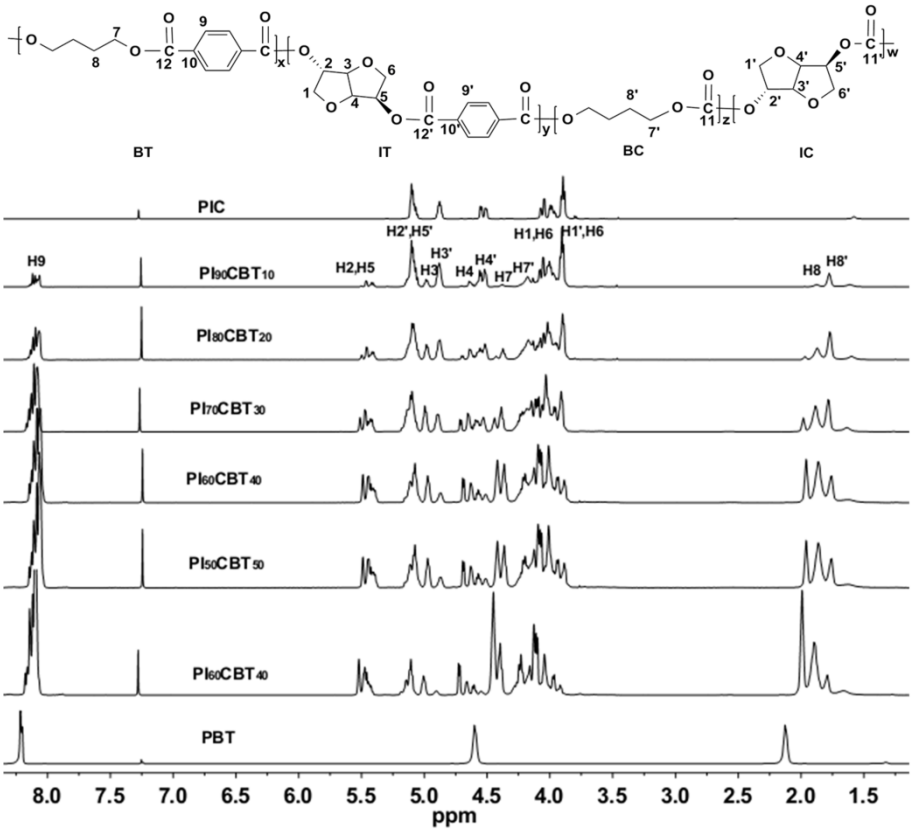

Fig.1S Comparison of ^{1}H NMR spectra of the PICBT copolyesters

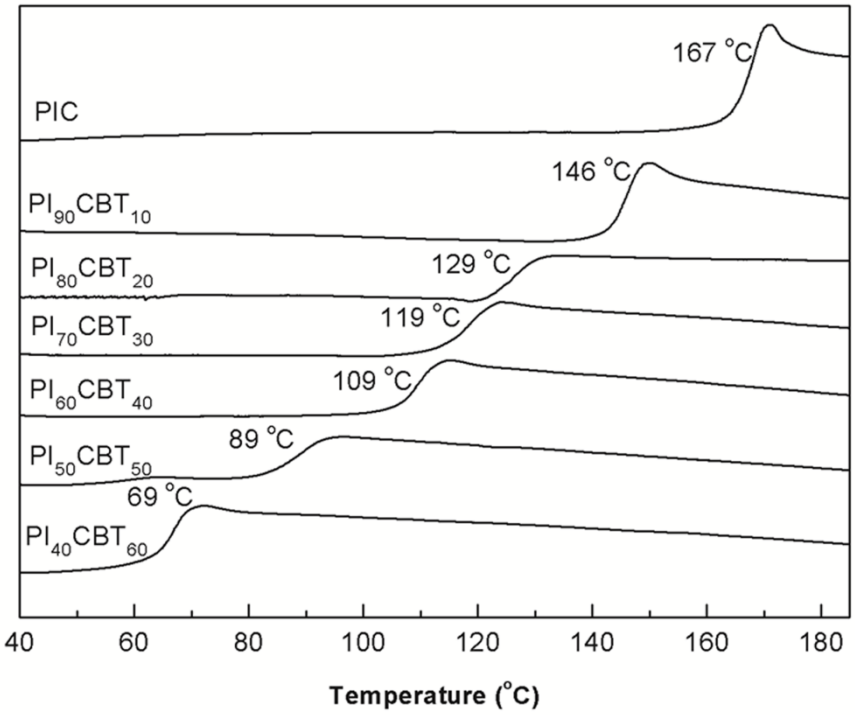

Fig. 2S DSC heating traces of the PICBT copolymers

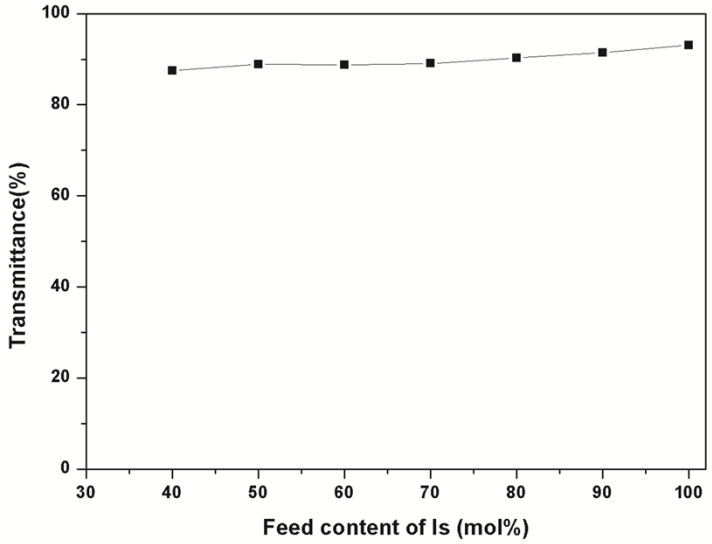

Fig. 3S The transmittance of the PICBT sheet (1mm) with varied feed content of Is. Transmittance was measured on a WGT-S light transmittance haze meter (Shanghai Precision & Scientific Instrument Co., Ltd).

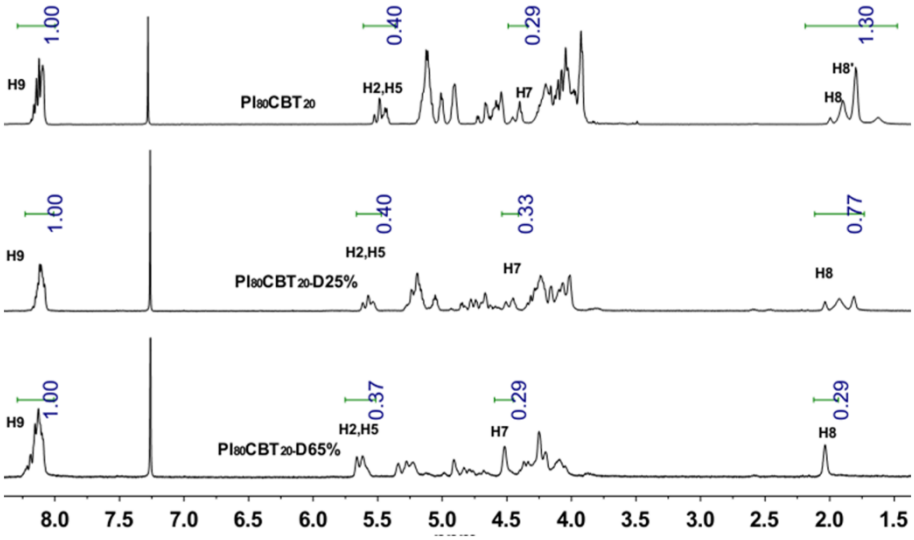

Fig. 4S ^{1}H NMR spectra of $PI_{80}CBT_{20}$, $PI_{80}CBT_{20}$-D25% and $PI_{80}CBT_{20}$-D65% ($PI_{80}CBT_{20}$-D25%: residual $PI_{80}CBT_{20}$ sample with 25% weight loss under isothermal degradation at 370 ^{o}C; $PI_{80}CBT_{20}$-D65%: residual $PI_{80}CBT_{20}$ sample with 65% weight loss under isothermal degradation at 370 ^{o}C)

To demonstrate the first step of the thermal degradation of $PI_{80}CBT_{20}$ around 370 ^{o}C was attributed to the combined weight loss of carbonate component of BC and IC, TGA and ^{1}H NMR were used to characterize $PI_{80}CBT_{20}$ residues after isothermal thermal degradation. At first the isothermal degradation of $PI_{80}CBT_{20}$ at 370 ^{o}C was conducted by TGA and then the molecular structure of the residues with different weight losses (25%, 65%) was characterized by ^{1}H NMR and the corresponding results are shown in Fig. 4S. From the molar fractions calculated by integrating the relative peak areas in Fig. 4S, the molar fraction of H2, H5 and H7 attributed to the Is moiety and butylene moiety bonded to terephthalate respectively is nearly invariable, indicating that the BT unit and IsT unit were not decomposed during the isothermal degradation of $PI_{80}CBT_{20}$. Table 1S shows the composition and dyad fraction of $PI_{80}CBT_{20}$, $PI_{80}CBT_{20}$-D25% and $PI_{80}CBT_{20}$-D65%. A sharp decline of the dyad fraction of BC and IC unit was observed with the increase weight loss of $PI_{80}CBT_{20}$, confirming that first step around 370 ^{o}C in the non-isothermal TGA curves is mainly attributed to the combined weight loss of carbonate component of BC and IC.

Table 1S Microstructure analysis of $PI_{80}CBT_{20}$, $PI_{80}CB_{20}T$-D25% and $PI_{80}CBT_{20}$-D65%

Sample code	Composition ratio(Is/T/B/C)	Dyad fraction			
		BT	BC	IT	IC
$PI_{80}CBT_{20}$	36/12/14/38	6.4	22.3	17.7	53.6
$PI_{80}CBT_{20}$-D25%	38/17/13/32	10.9	13.9	26.5	48.6
$PI_{80}CBT_{20}$-D65%	39/37/11/13	21.6	0	53.7	24.7

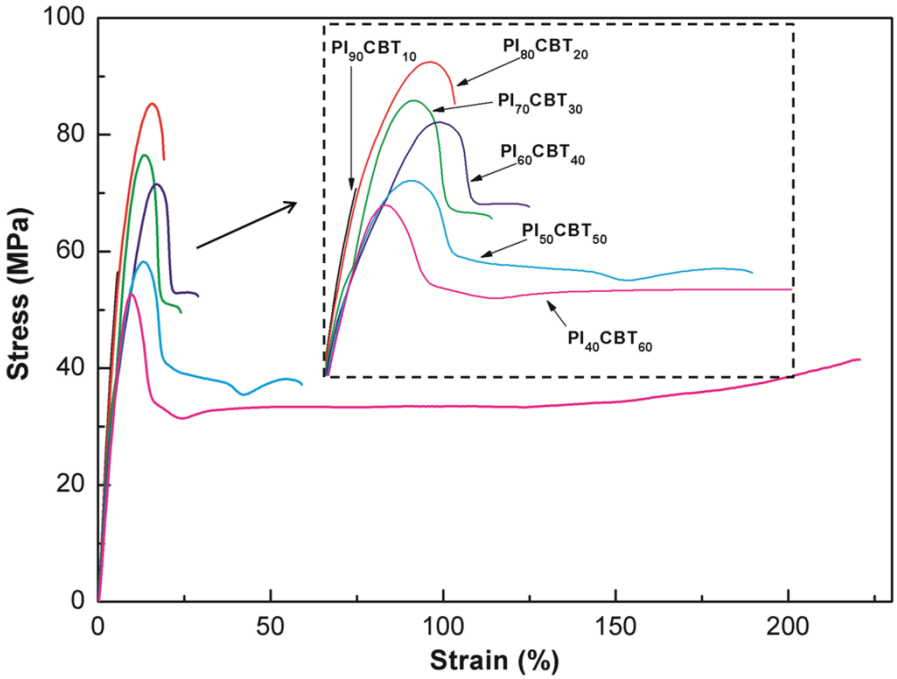

Fig. 5S Stress-strain curves of the PICBT copolymers.