

Supplementary Information

Stepwise copolymerization of polybenzimidazole for a low dielectric constant and ultrahigh heat resistance

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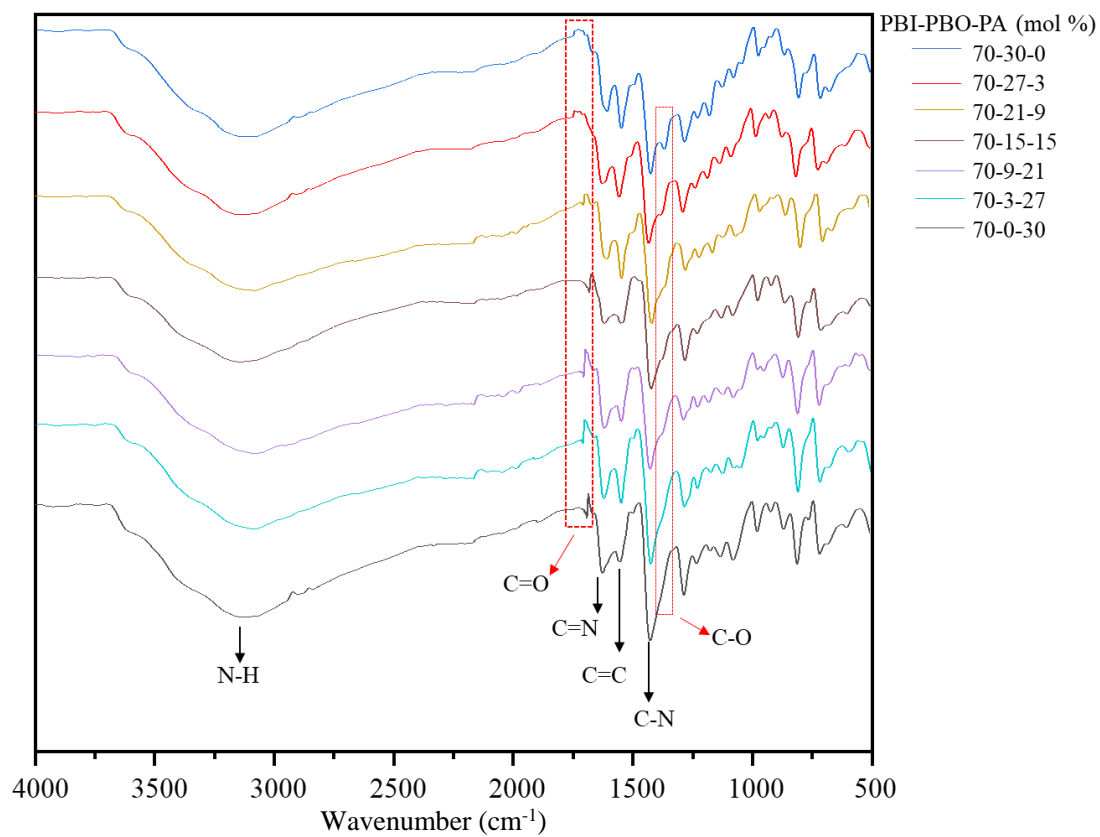


Figure S1. FT-IR spectra of terpolymer in varies molar compositions.

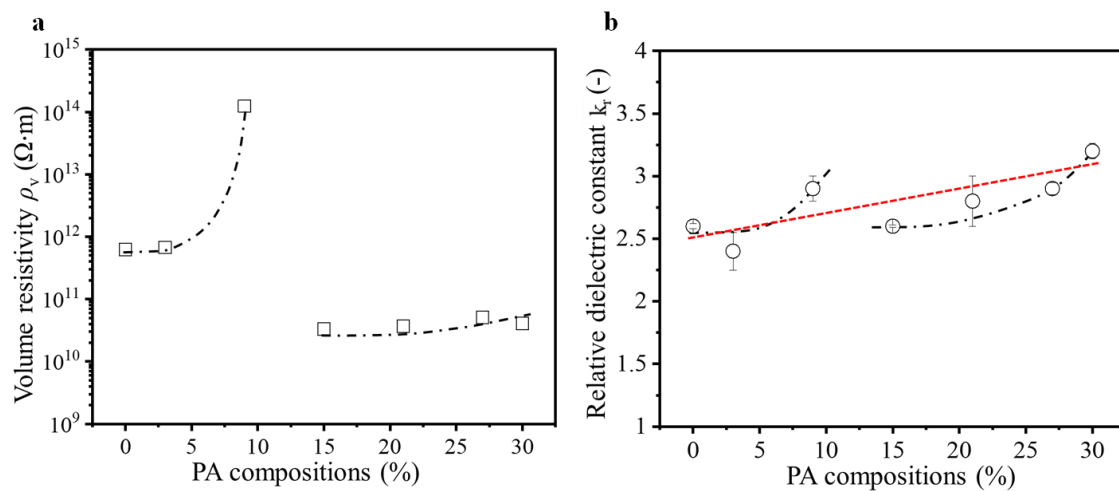


Figure S2 Dielectric properties of terpolymers. **a** Volume resistivity and **b** relative dielectric constant at 1 MHz for dried P(BI-*b*-BO-A) films of different PA compositions. The broken lines were drawn by naked eyes and the dotted line in **b** was drawn by eq. (2)

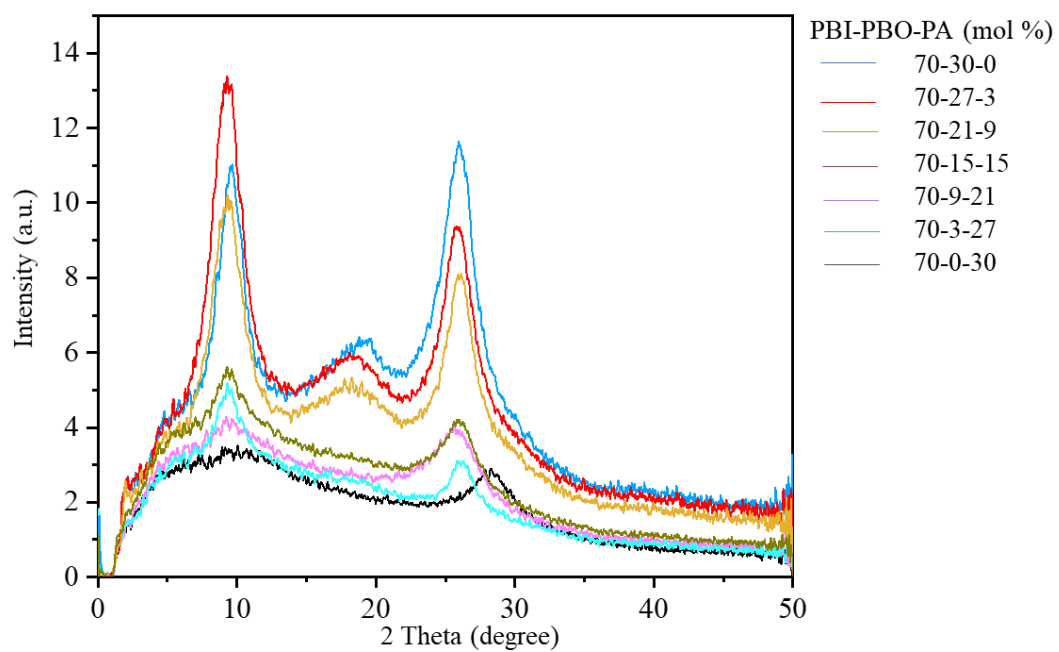


Figure S3. X-ray diffraction curves on terpolymer of varies of molar compositions.

Table S1. The degree of crystallinity of terpolymers.

PBI-PBO-PA (mol %)	Degree of crystallinity (%)
70-30-0	23
70-27-3	24
70-21-9	21
70-15-15	9
70-9-21	7
70-3-27	8
70-0-30	5

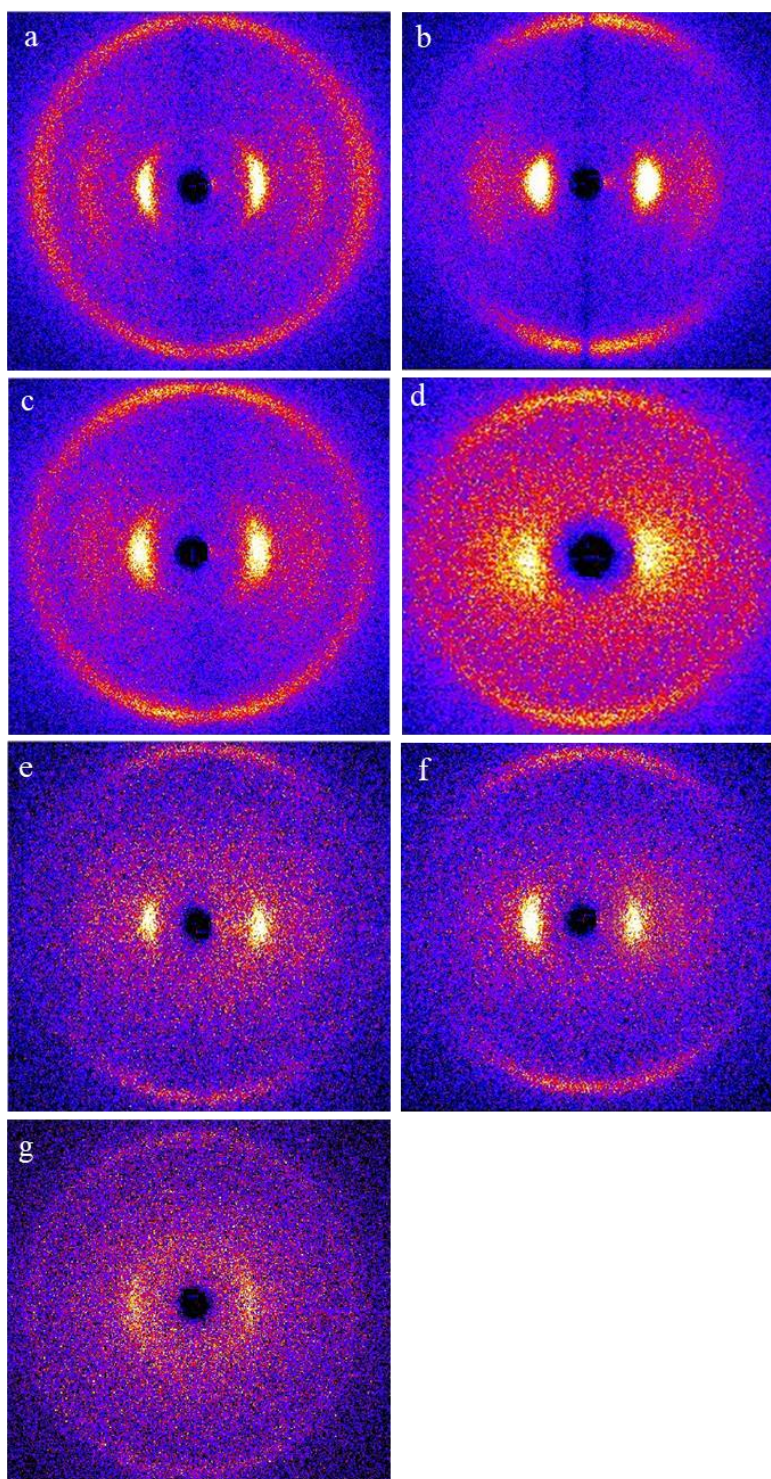


Figure S4. X-ray diffraction patterns of terpolymers synthesized by stepwise polymerization under various molar compositions of PBI-PBO-PA (mol %): a 70-30-0; b 70-27-3; c 70-21-9; d 70-15-15; e 70-9-21; f 70-3-27; g 70-0-30.

Calculation of crystallinity from XRD analysis:

According to the XRD curves, it is obviously that there is a sudden change in the crystallinity when PA ratio exceeds 9% (**Figure S4**), the degree of crystallinity is listed in **Table S1**, indicating the structural change occurred from the ratio 70-15-15, this can also be observed directly from XRD pattern as is showed in **Figure S4**.