



Fig. S1 The picture of scale-up synthesized PA4F

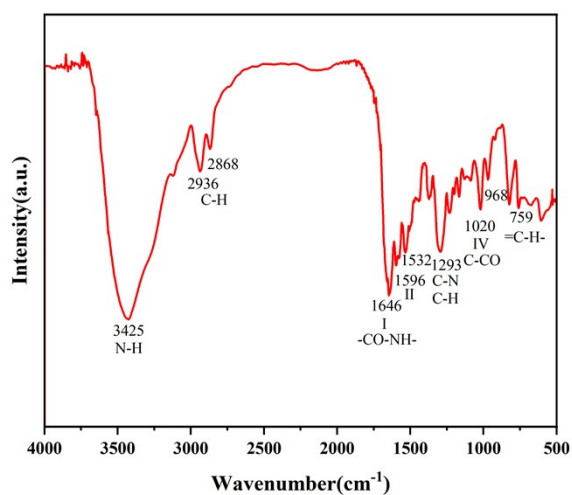


Fig. S2 FT-IR of PA4F<sup>1</sup>.

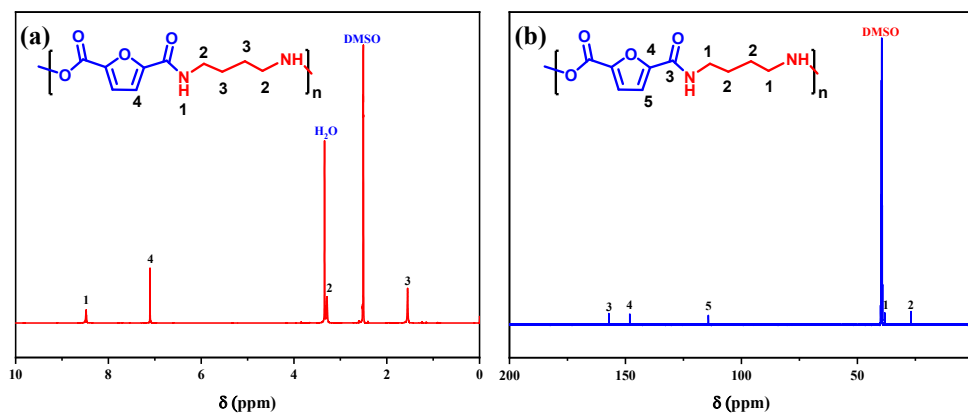


Fig. S3 (a) <sup>1</sup>H NMR and (b) <sup>13</sup>C NMR spectrum of PA4F<sup>1</sup>.

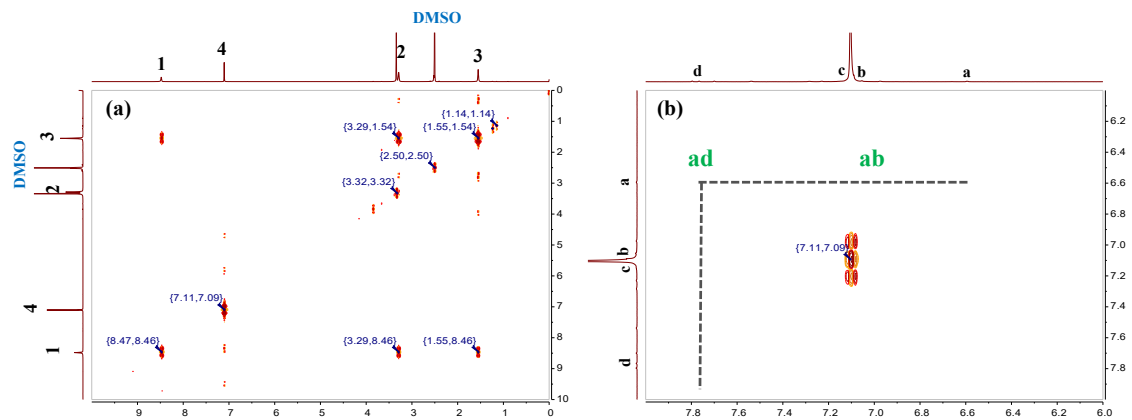


Fig. S4 2D TOCSY of PA4F<sup>1</sup> (DMSO-d<sub>6</sub>) (a) range 0.5–9.5 ppm. (b) range 6–8.0 ppm.

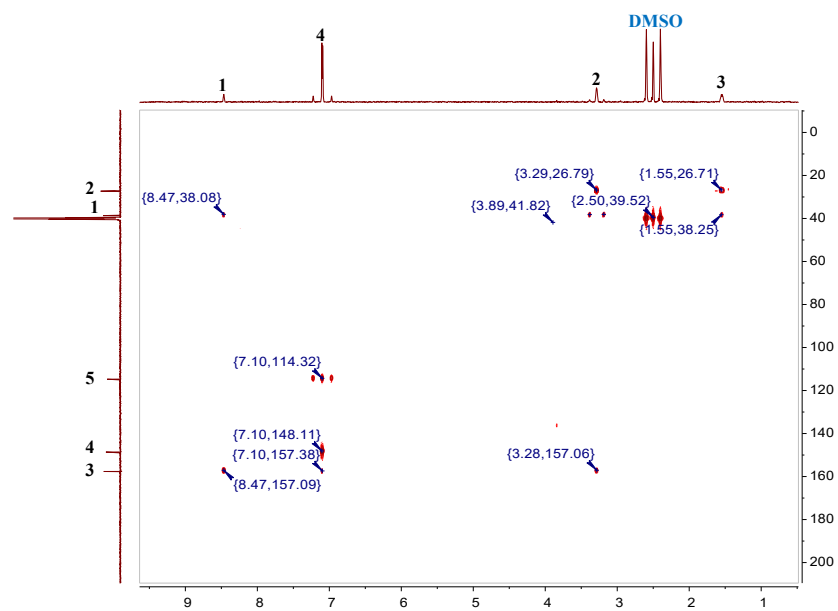


Fig. S5 2D HMBC of PA4F<sup>1</sup> (DMSO-d<sub>6</sub>).

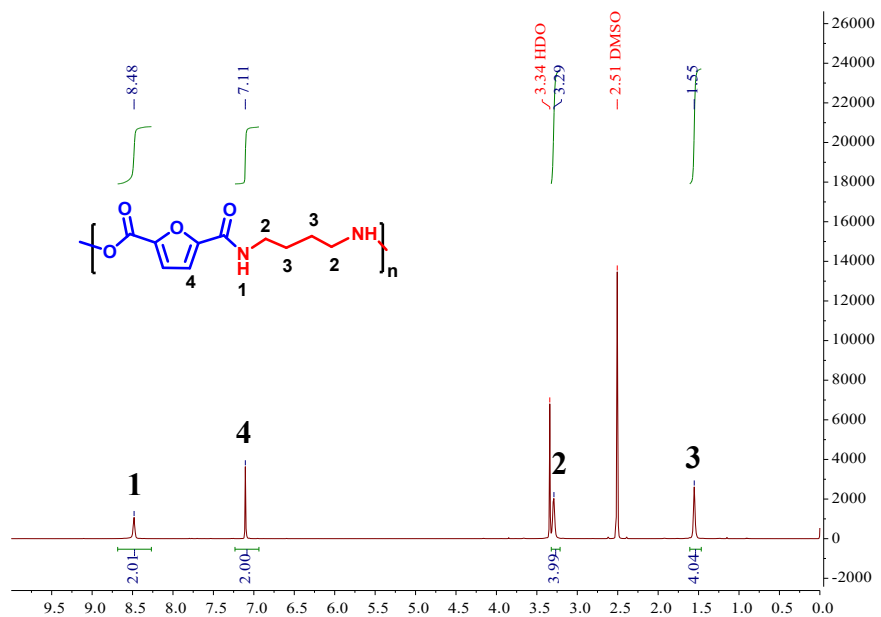


Fig. S6 <sup>1</sup>H NMR spectrum recorded for PA4F<sup>1</sup> polymer in DMSO-d<sub>6</sub>.

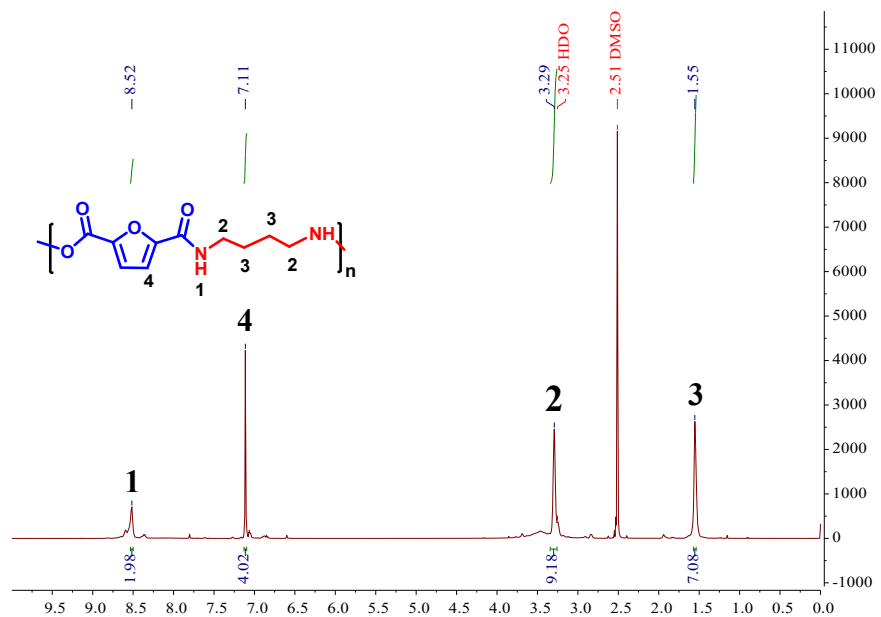


Fig. S7 <sup>1</sup>H NMR spectrum recorded for PA4F<sup>2</sup> polymer in DMSO-d<sub>6</sub>.

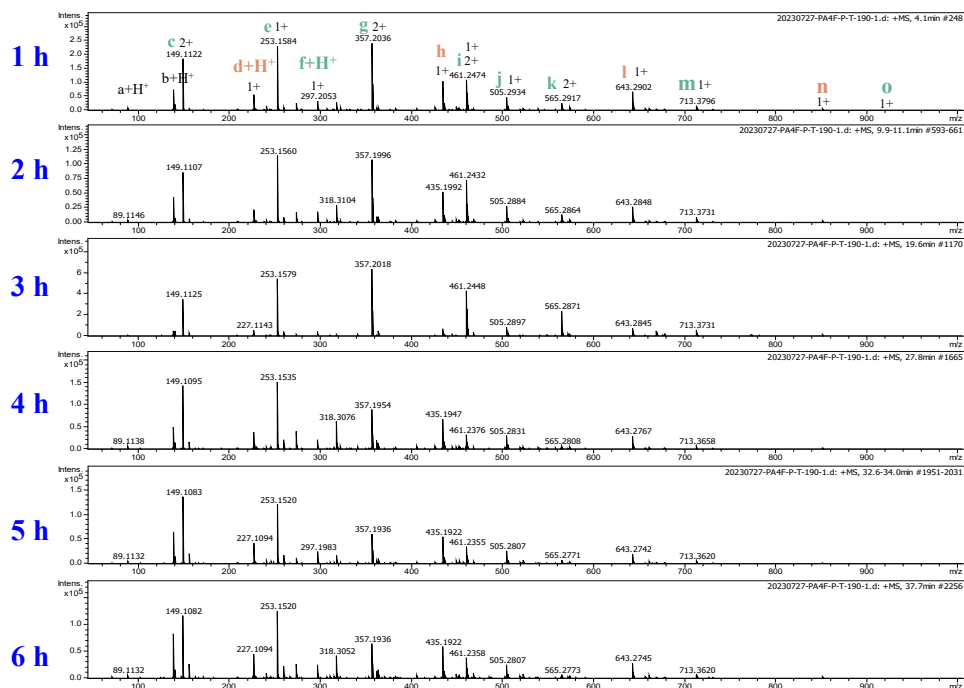


Fig. S8 ESI-MS spectra of samples at different times under 190°C.

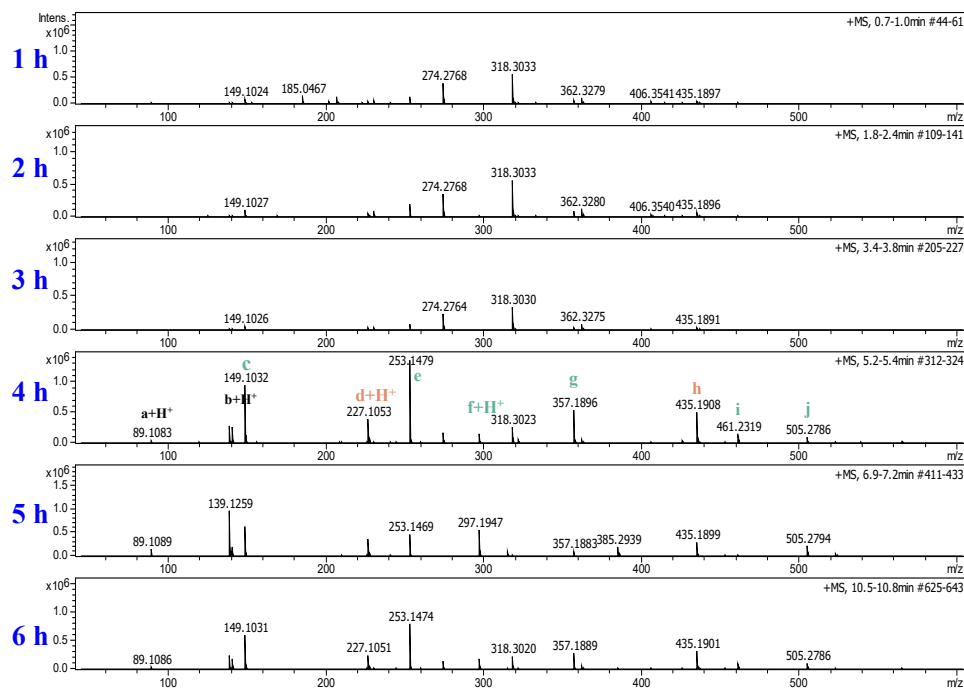


Fig. S9 ESI-MS spectra of samples at different times under 150°C.

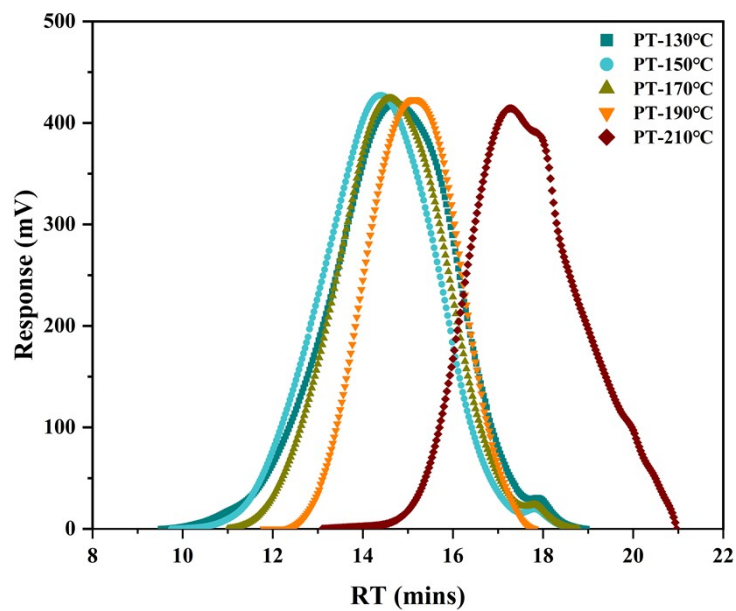


Fig. S10 GPC curves of PA4F at different prepolymerization temperature.

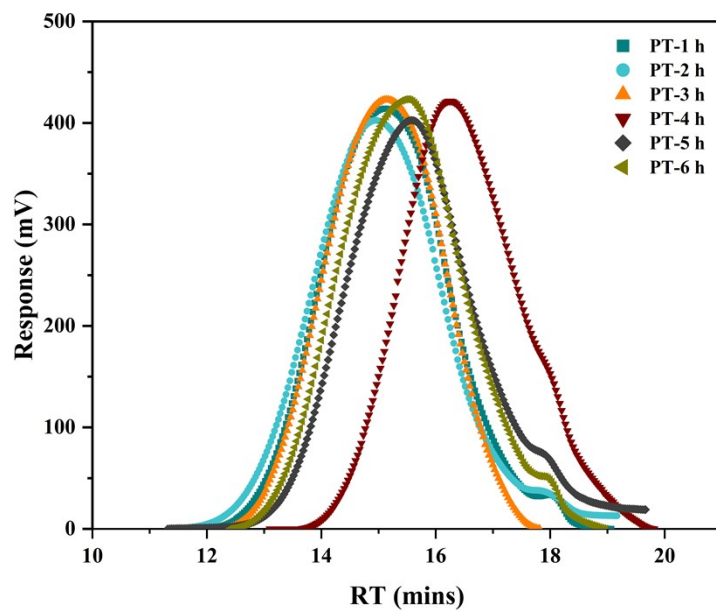


Fig. S11 GPC curves of PA4F at different prepolymerization time

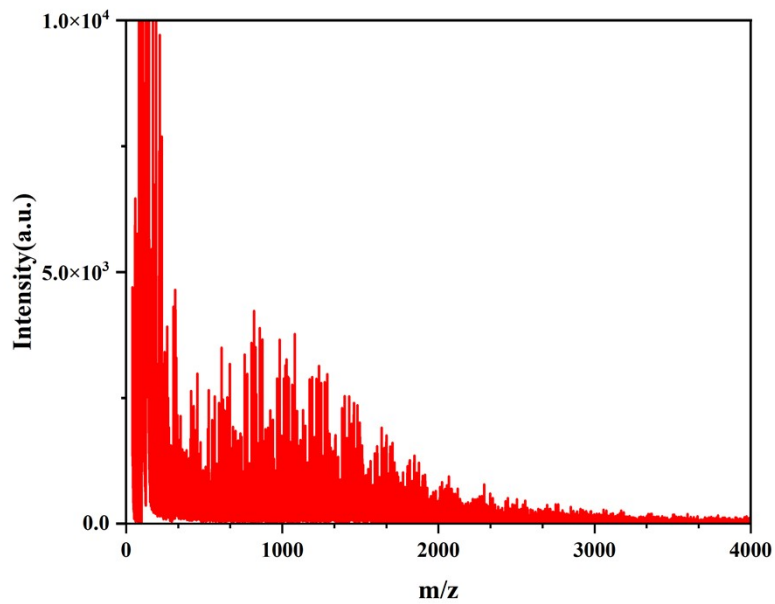


Fig. S12 MALDI-TOF MS spectrum of PA4F<sup>2</sup>.

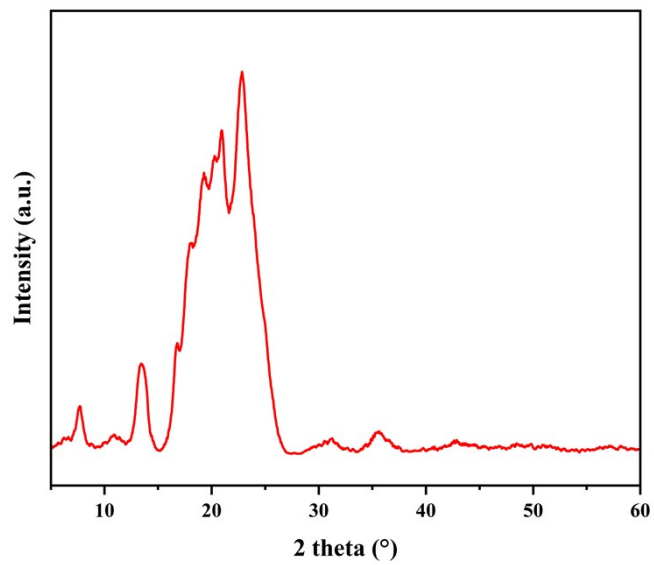


Fig. S13 WAXD spectrum of PA4F<sup>1</sup>.

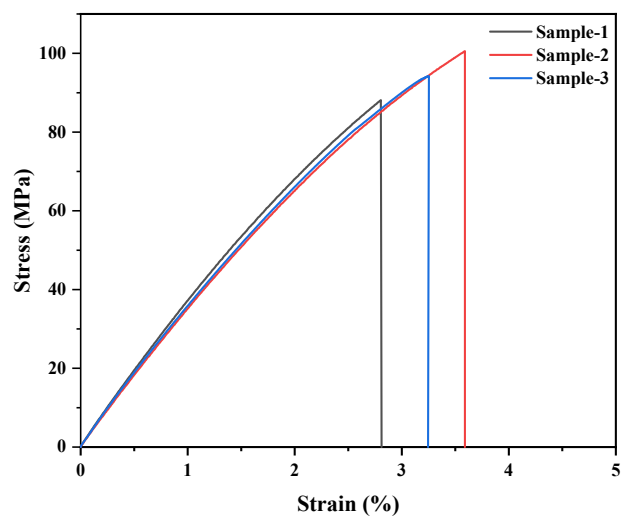


Fig. S14 Stress-strain curves for PA4F compression moulded specimens.

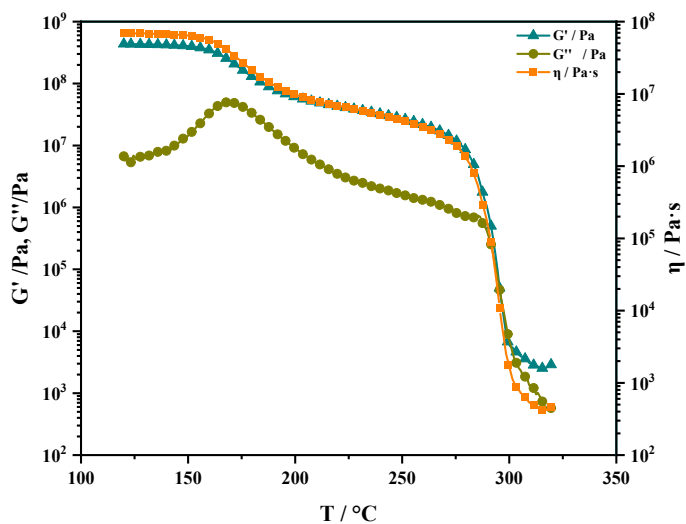


Fig. S15 The temperature dependence of the storage and loss moduli ( $G'$  and  $G''$ ) and complex viscosity ( $\eta$ ) for the scale-up synthesis of PA4F product.