Supplementary information

Controlled polymerization and side reaction mechanism of bio-sourced pentanediamine-derived semi-aromatic copolyamide

Kejian Yang[1], Yanlin Liu[2]*, Zhikun Zheng[1], Zhaobin Tang[2]*, Xudong Chen[1, 3, 4]*

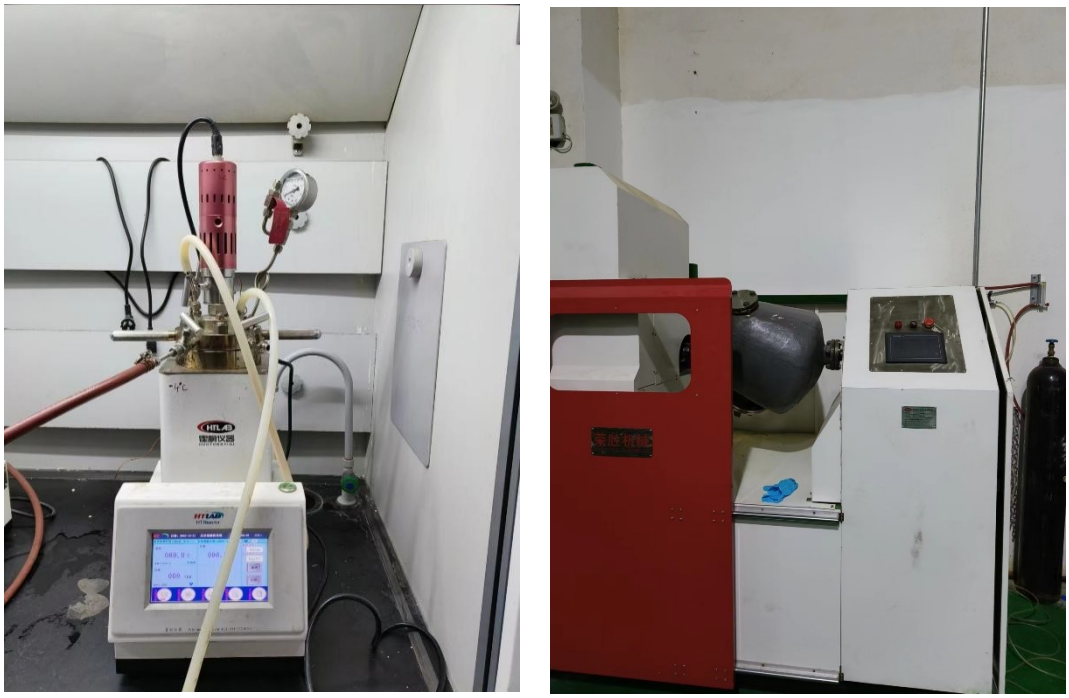
[1] Key Laboratory for Polymeric Composite and Functional Materials of Minis-try of Education, Guangdong Engineering Technology Research Center for High-performance Organicand Polymer Photoelectric Functional Films, School of Chemistry, Sun Yat-sen University, Guangzhou 510275, P. R.China;

[2] Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo 315201, P. R. China;

[3] Jieyang Branch of Chemistry and Chemical Engineering Guangdong Laboratory, Jieyang 515200, P. R. China;

[4] School of Chemical Engineering and Light Industry, Guangdong University of Technology, Guangzhou 510006, P. R. China.

*Corresponding authors: (Yanlin Liu) E-mail liuyanlin@nimte.ac.cn; (Zhaobin Tang) E-mail tangzhb04@nimte.ac.cn; (Xudong Chen) E-mail cescxd@mail.sysu.edu.cn.



(a) (b)

Fig. S1 Polymerization unit (a. autoclave of 1 L; b. solid-state reactor of 20 L).

Fig. S2 Polymerization unit of 200 L.

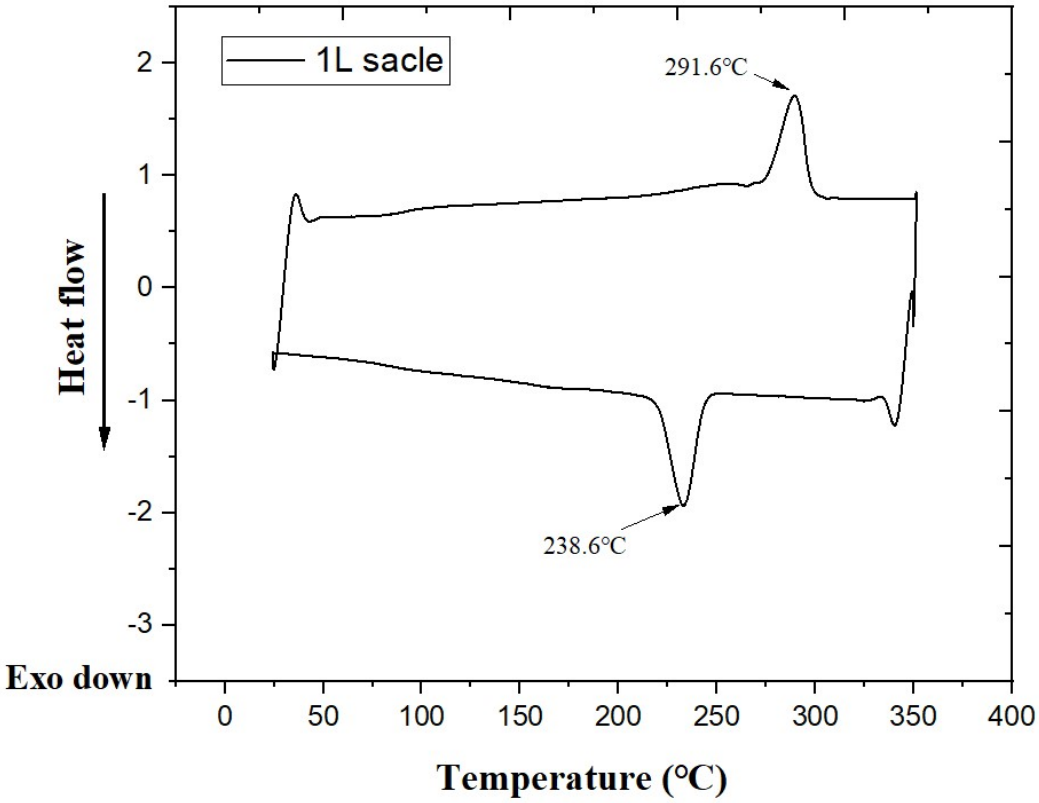


Fig. S3 Non-isothermal DSC curve of PA 5T/56 prepared in 1 L scale.

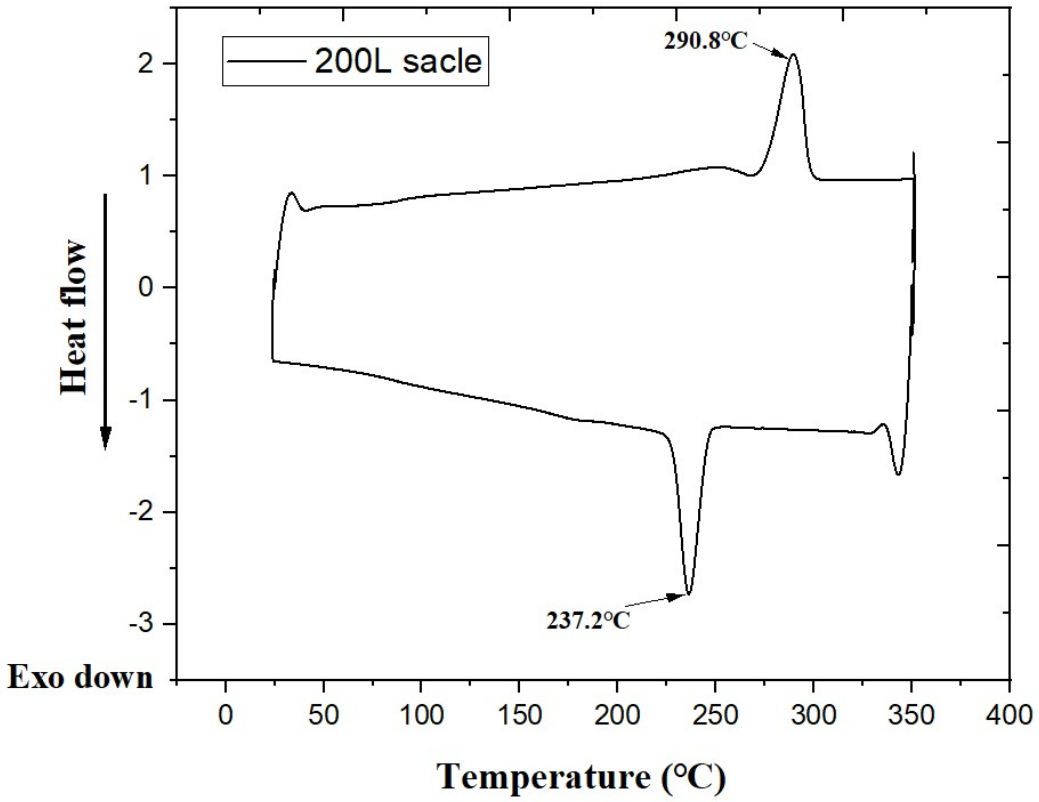
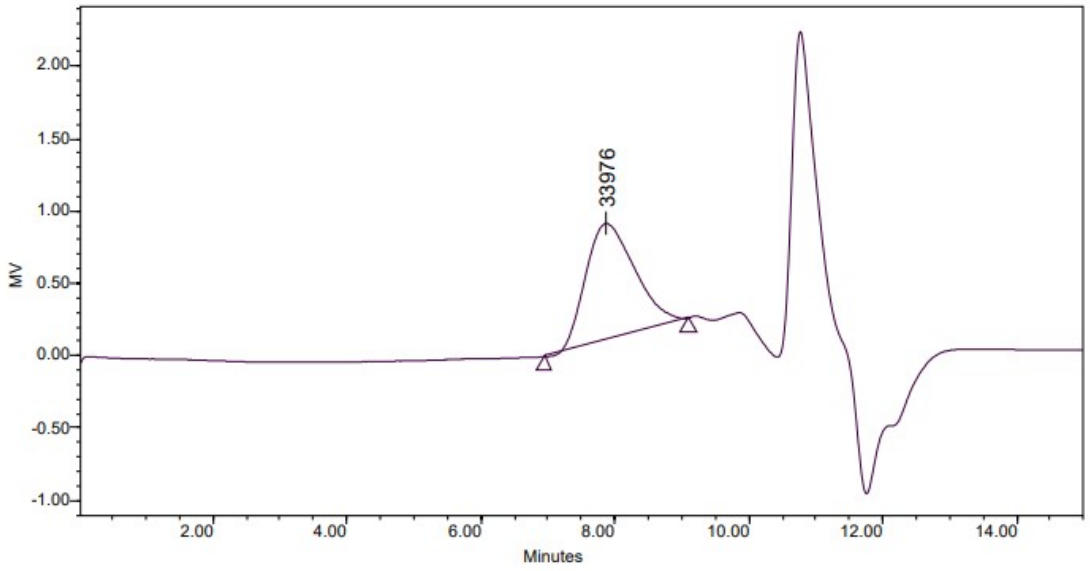


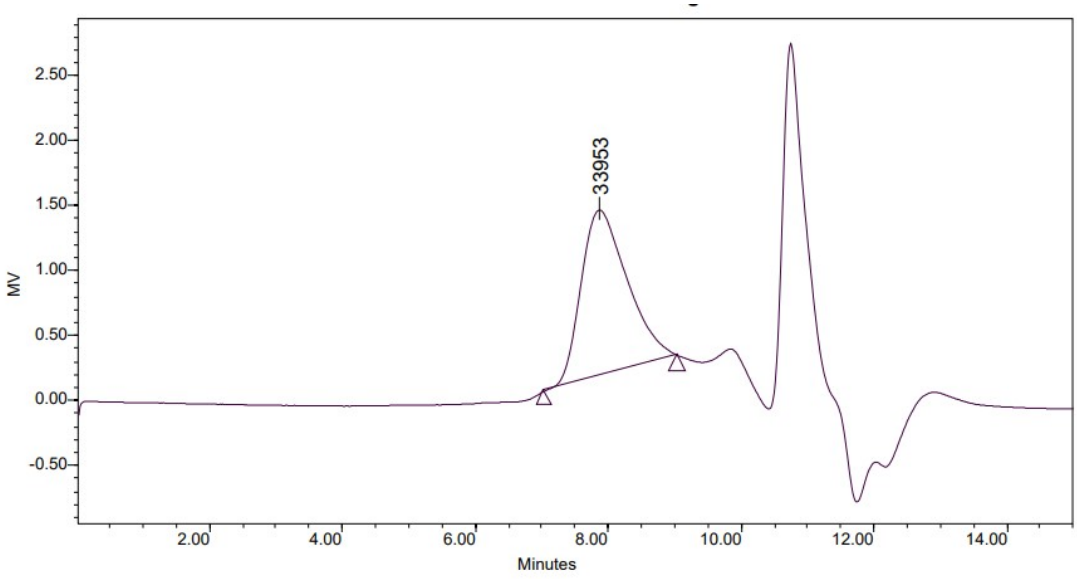
Fig. S4 Non-isothermal DSC curve of PA 5T/56 prepared in 200 L scale.



Broad Unknown Relative Peak Table

	Distribution Name	Mn (Daltons)	Mw (Daltons)	MP (Daltons)	Mz (Daltons)	Mz+1 (Daltons)	Polydispersity	Mz/Mw	Mz+1/Mw
1		22020	34984	33976	50019	64707	1.588734	1.429778	1.849616

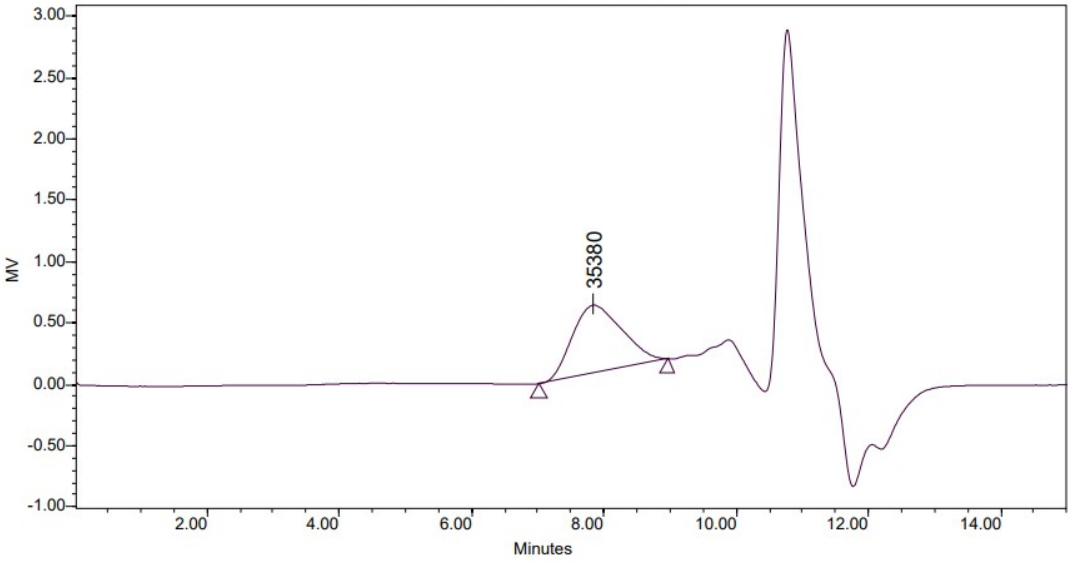
Fig. S5 GPC data of PA 5T/56 prepared in 1 L scale.



Broad Unknown Relative Peak Table

	Distribution Name	Mn (Daltons)	Mw (Daltons)	MP (Daltons)	Mz (Daltons)	Mz+1 (Daltons)	Polydispersity	Mz/Mw	Mz+1/Mw
1		21050	33245	33953	47296	62234	1.579387	1.422642	1.871964

Fig. S6 GPC data of PA 5T/56 prepared in 200 L scale.



Broad Unknown Relative Peak Table

	Distribution Name	Mn (Daltons)	Mw (Daltons)	MP (Daltons)	Mz (Daltons)	Mz+1 (Daltons)	Polydispersity	Mz/Mw	Mz+1/Mw
1		23583	37914	35380	55277	72573	1.607638	1.457963	1.914172

Fig. S7 GPC data of commercially available high-temperature resistant PA (A6000).

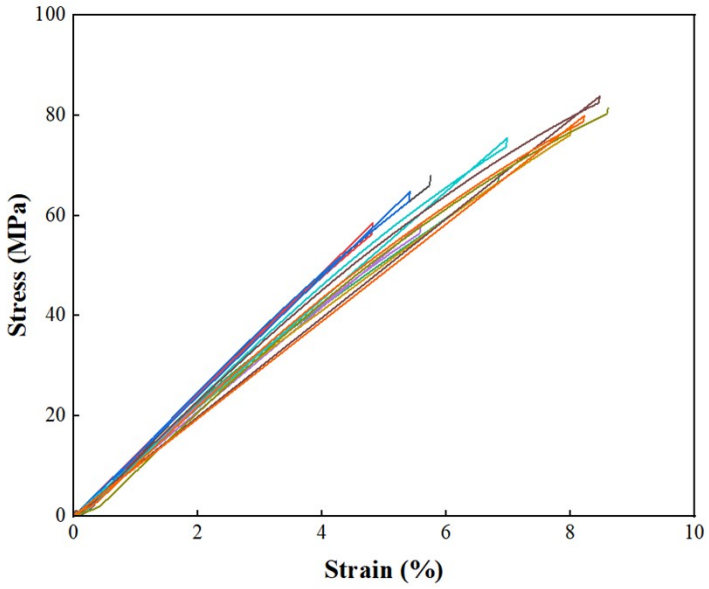


Fig. S8 Stress-strain curves of commercially available high-temperature resistant PA (A6000).

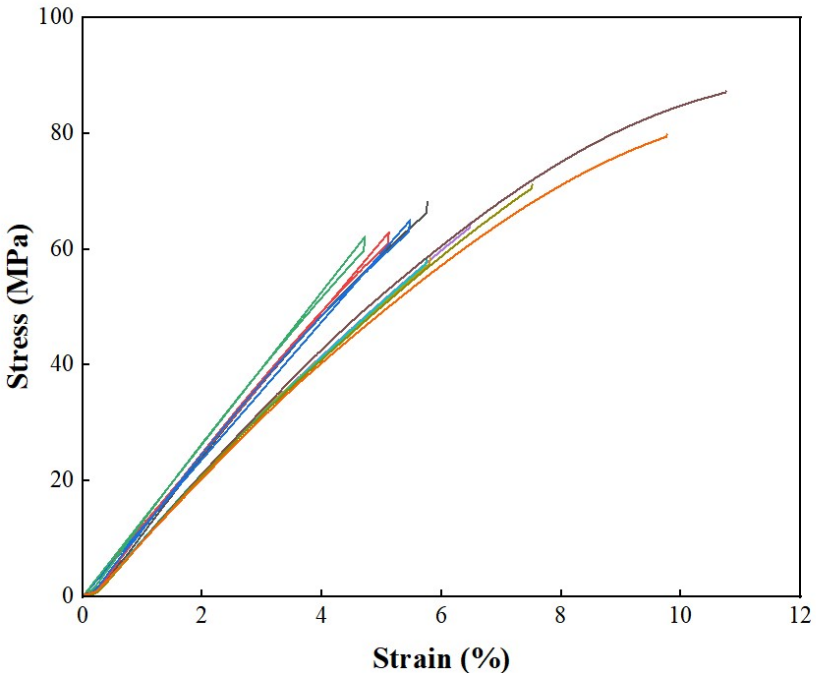


Fig. S9 Stress-strain curves of PA 5T/56 prepared in 200 L scale.

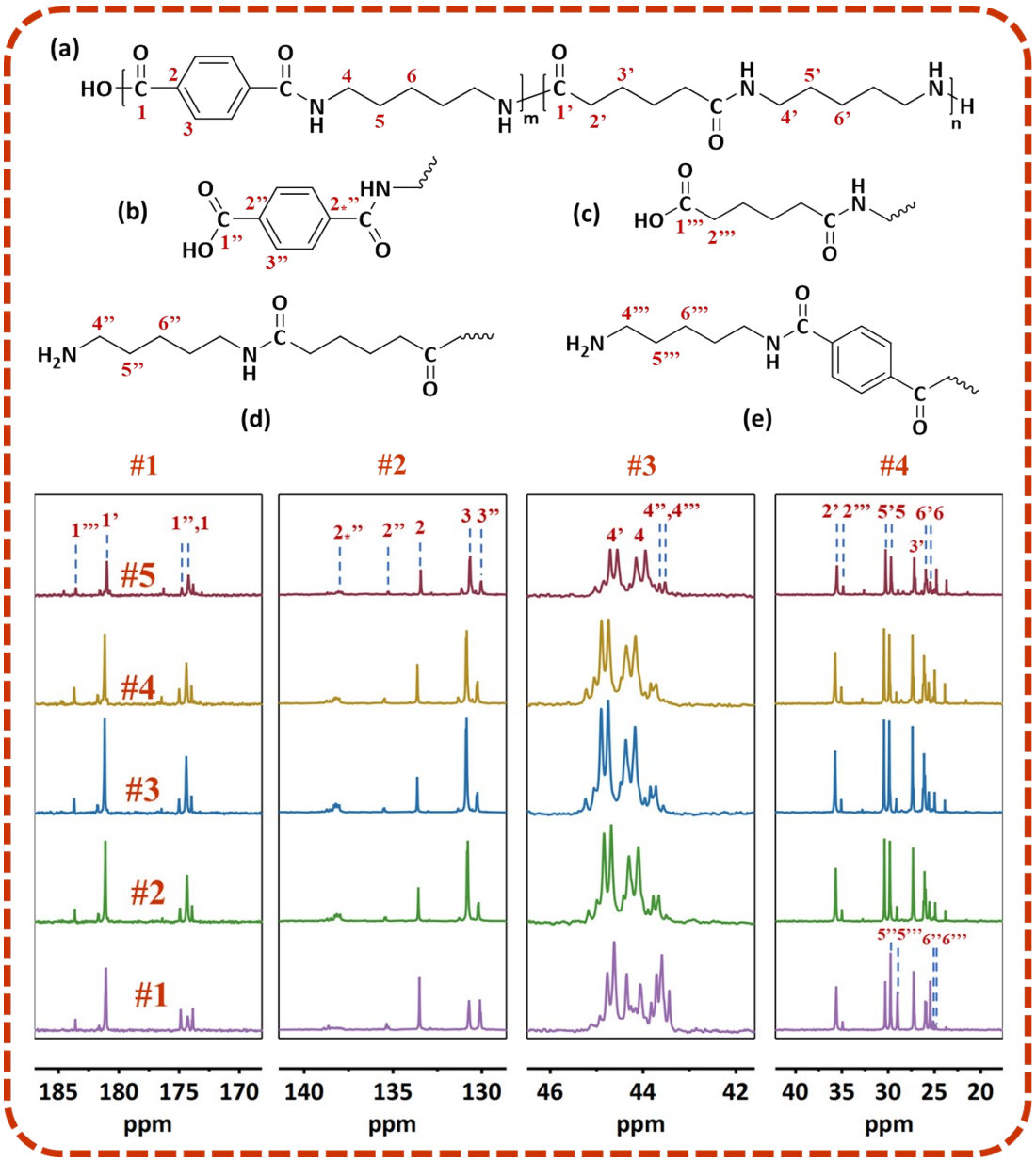


Fig. S10 ^{13}C-NMR spectra of PA5T/56 prepolymers with different prepolymerization temperature and time (#1:220°C, 1h; #2: 260°C, 1h; #3: 260°C, 2h; #4: 260°C, 3h; #5: 260°C, 6h).