Electronic Supplementary Material (ESI) for Polymer Chemistry.
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Supporting Information

for

Side-Chain Poly(phosphoramidate)s via Acyclic Diene Metathesis Polycondensation

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1. NMR-spectra

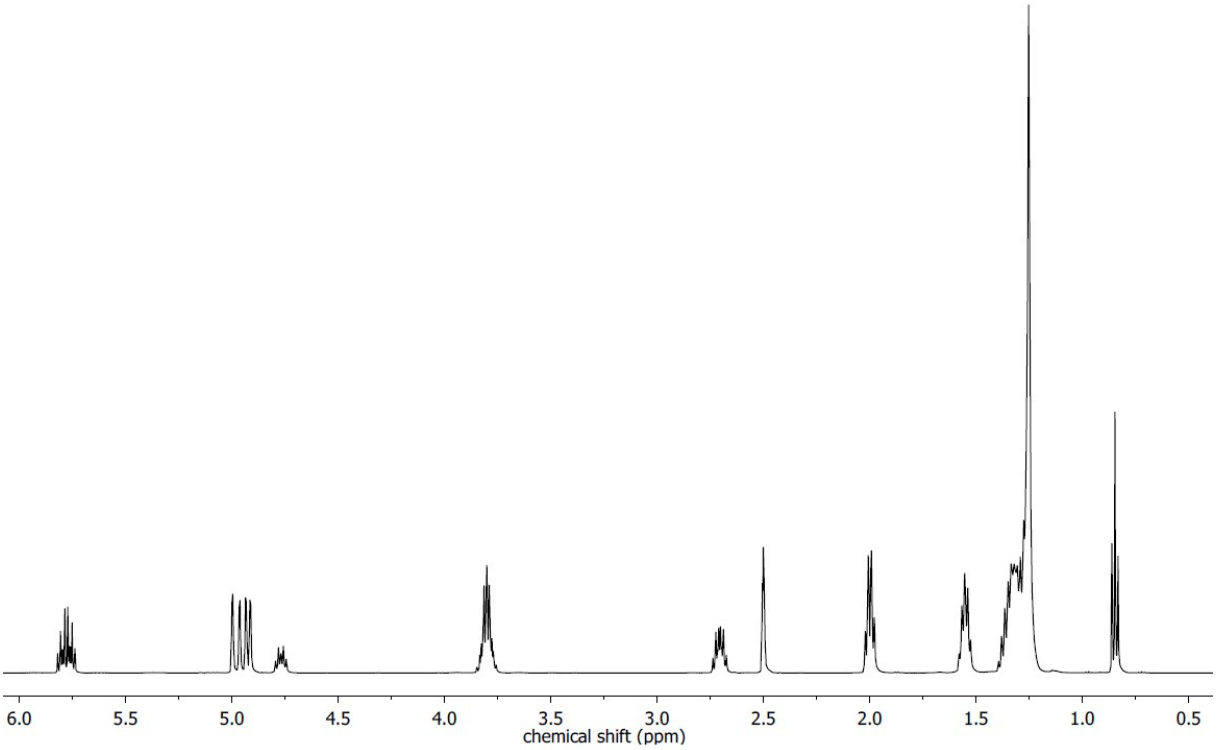

Fig. S1: ^{1}H NMR spectrum of **1** (298K, 300 MHz in DMSO-d_6).

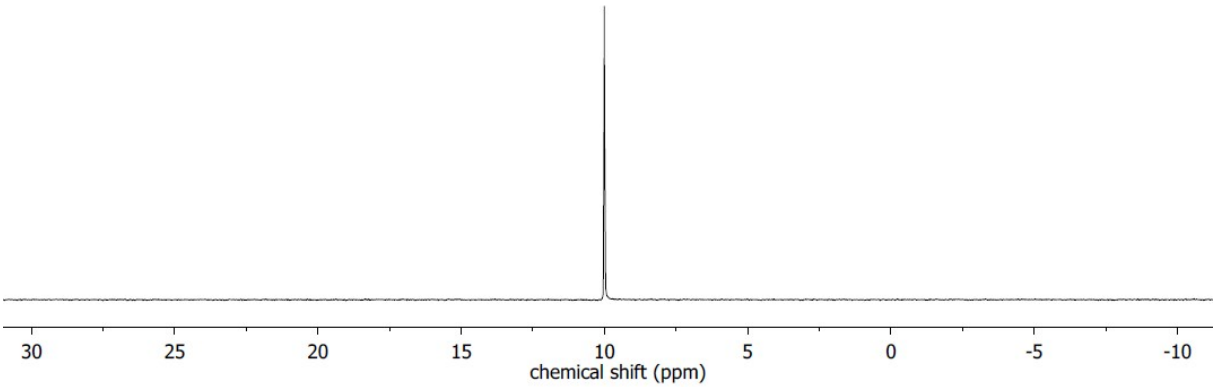

Fig. S2. ^{31}P NMR spectrum of **1** (298K, 202 MHz in DMSO-d_6).

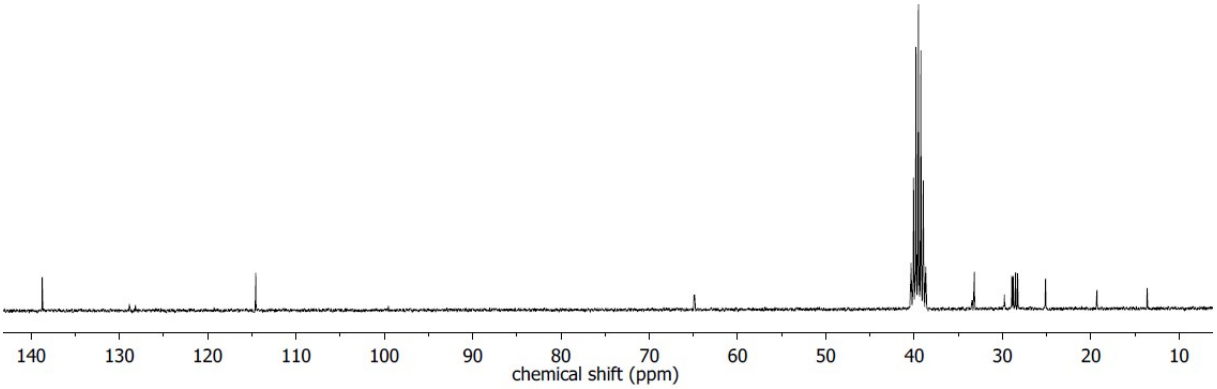

Fig. S3. ^{13}C NMR spectrum of **1** at (298 K, 125 MHz in DMSO-d_6).

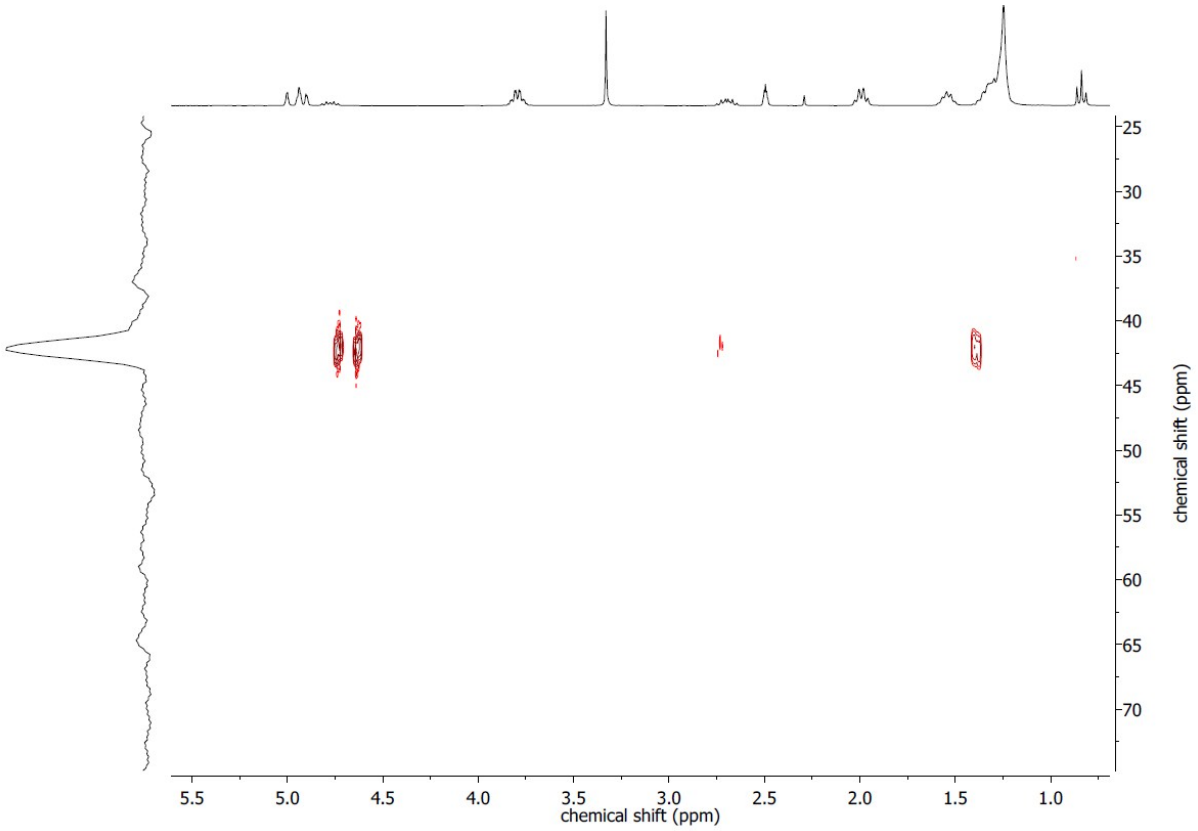

Fig. S4. $^{1}H^{15}N$ HMBC spectrum of **1** (298K, 710 MHz in DMSO-d_6). Cross relaxation between the ^{15}N signal at 42.29 ppm with the neighboring protons can be observed. Cross relaxation is displayed between the ^{15}N signal and the proton bound to the nitrogen atom at 4.75 ppm. The alpha (2.71 ppm) and beta (1.37 ppm) methylene groups to the amidate group show also cross relaxation.

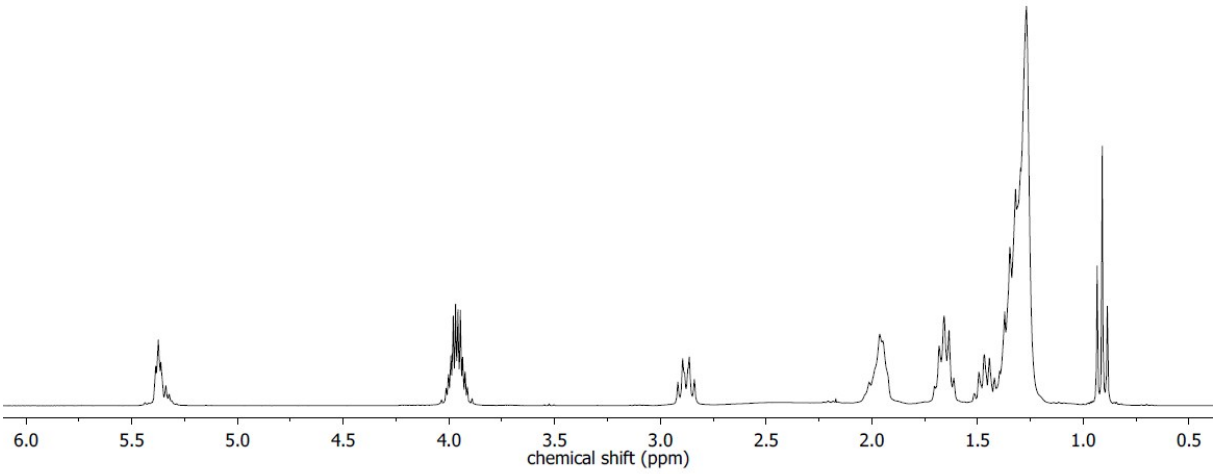

Fig. S5. ^{1}H NMR spectrum of **P1** (298 K, 300 MHz in $CDCl_3$).

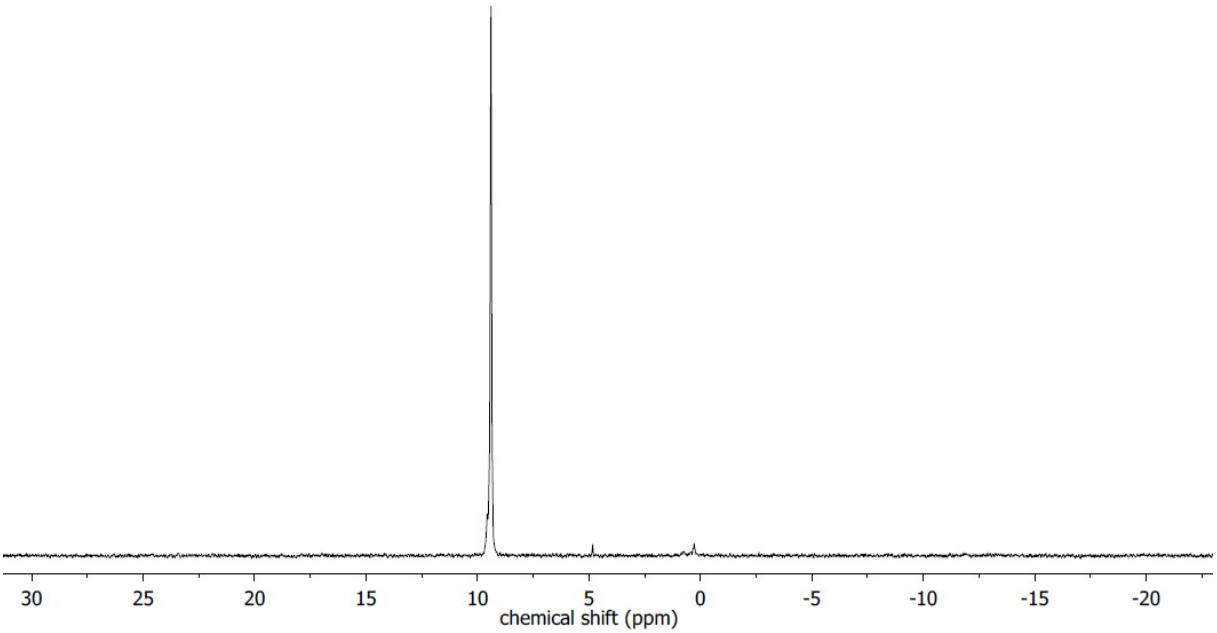

Fig. S6. ^{31}P NMR spectrum of **P1** (298 K, 202 MHz in $CDCl_3$).

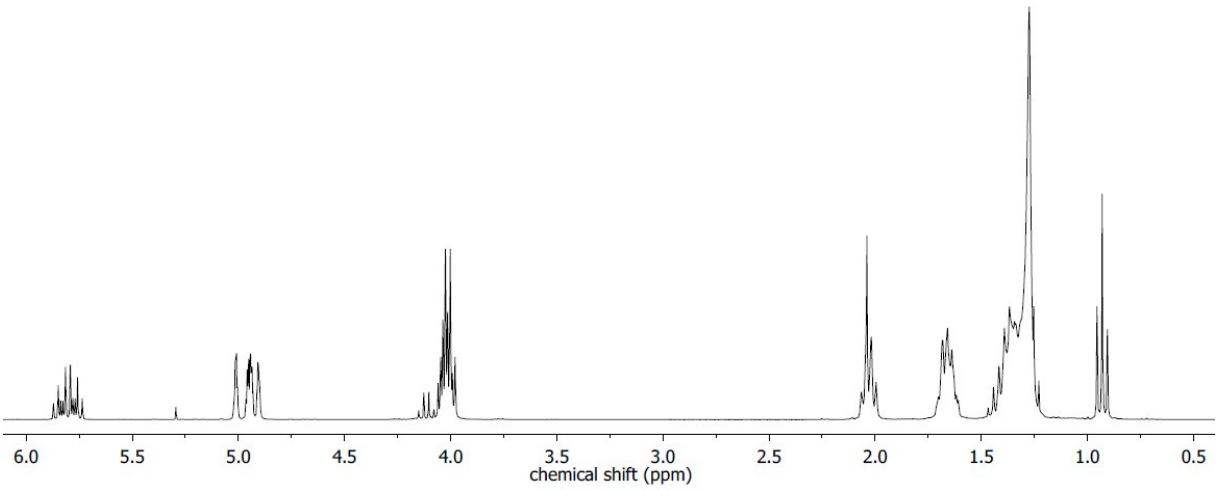

Fig. S7. ^{1}H NMR spectrum of **2** at (298 K, 300 MHz in $CDCl_3$).

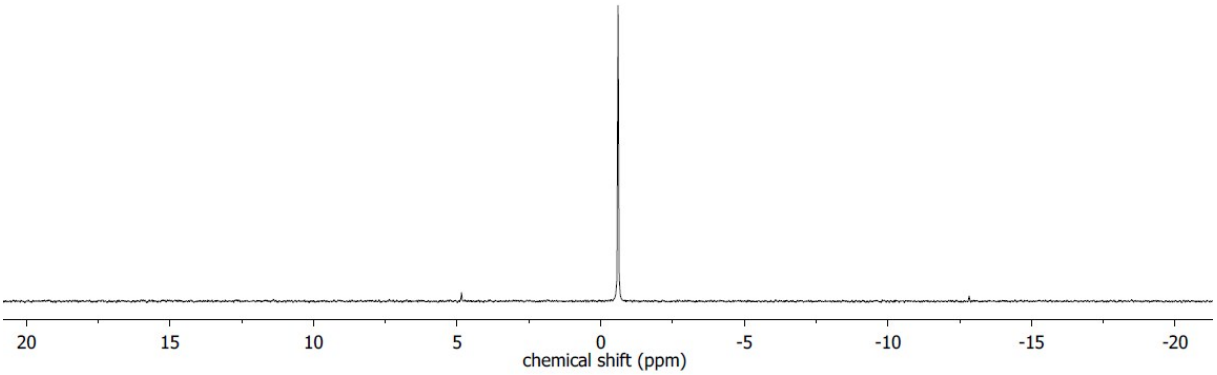

Fig. S8. ^{31}P NMR spectrum of **2** (298 K, 202 MHz in $CDCl_3$)

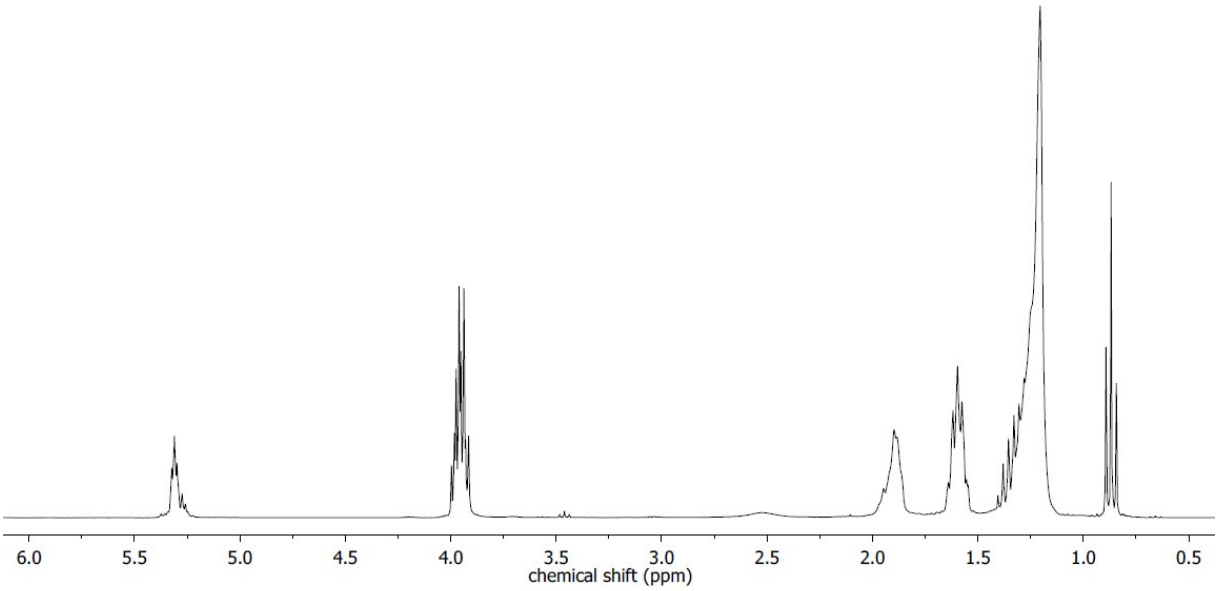

Fig. S 9. ^{1}H NMR spectrum of P2 at (298 K, 300 MHz in $CDCl_3$).

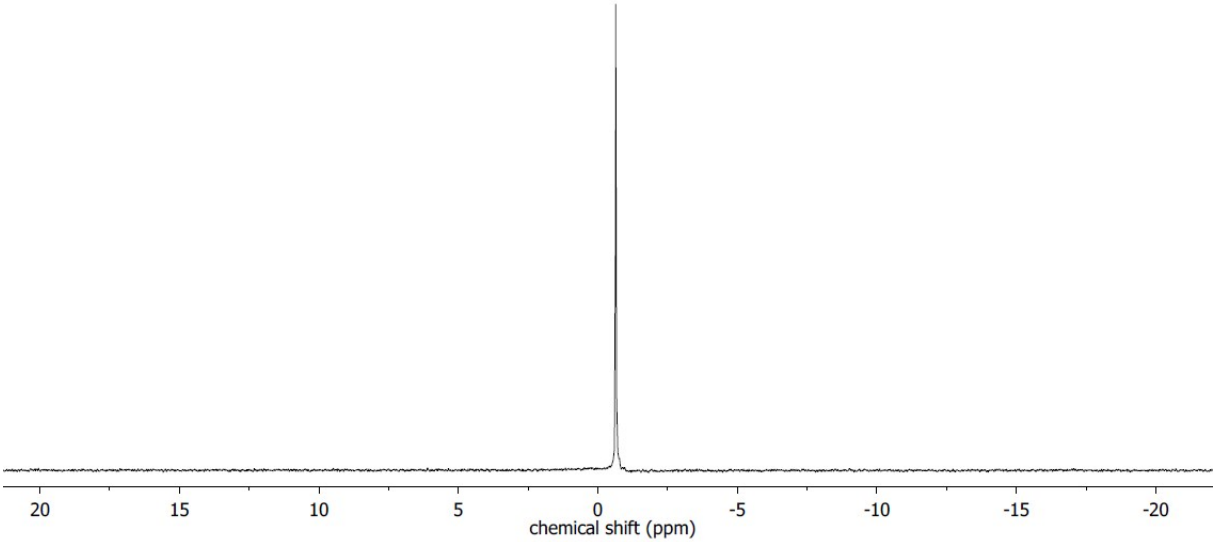

Fig. S 10. ^{31}P NMR spectrum of P2 at (298 K, 202 MHz in $CDCl_3$).

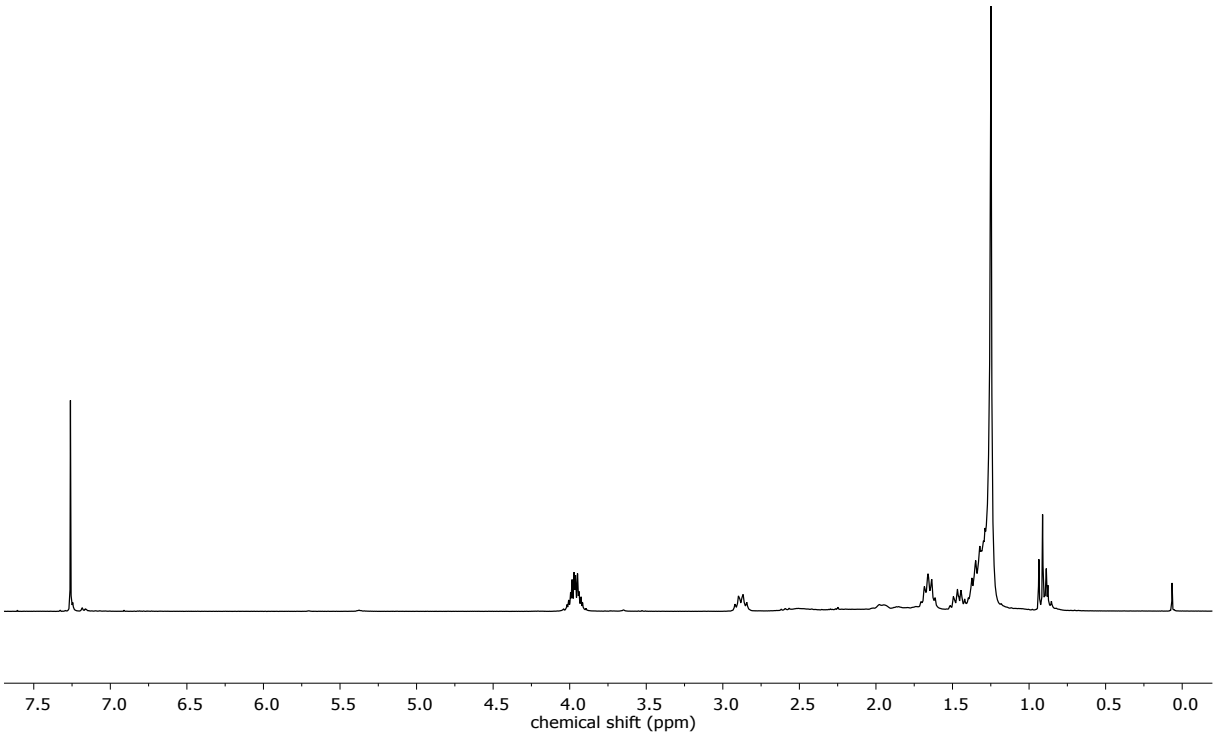

Fig. S11. ^{1}H NMR spectrum of **P1-H** at (298 K, 300 MHz in $CDCl_3$).

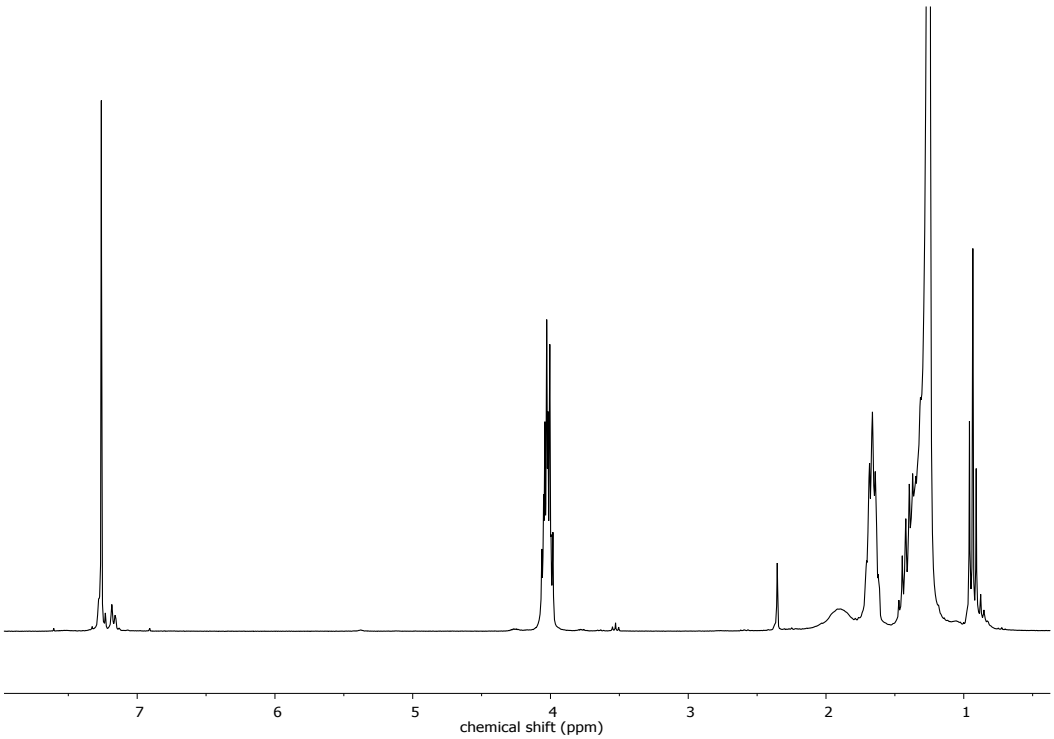

Fig. S12. ^{1}H NMR spectrum of **P2-H** at (298 K, 300 MHz in $CDCl_3$).

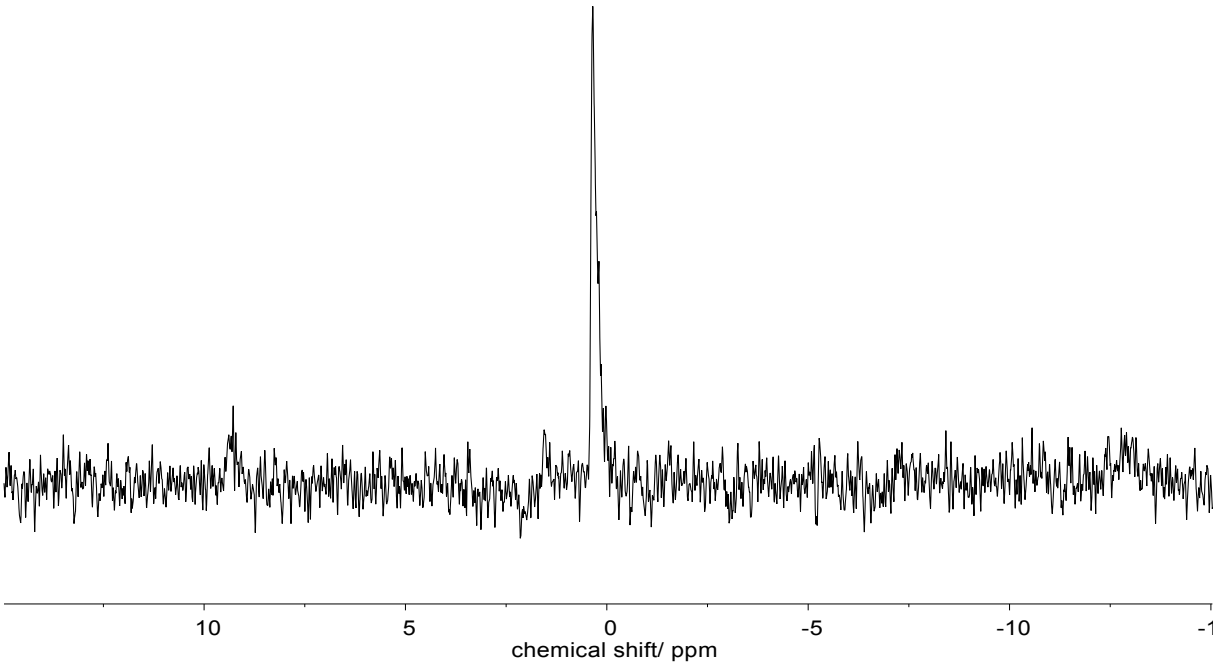

Fig. S13. ^{31}P NMR spectrum after side-chain cleavage of **P1** at (298 K, 121.5 MHz in $CDCl_3$).

2. GPC-data

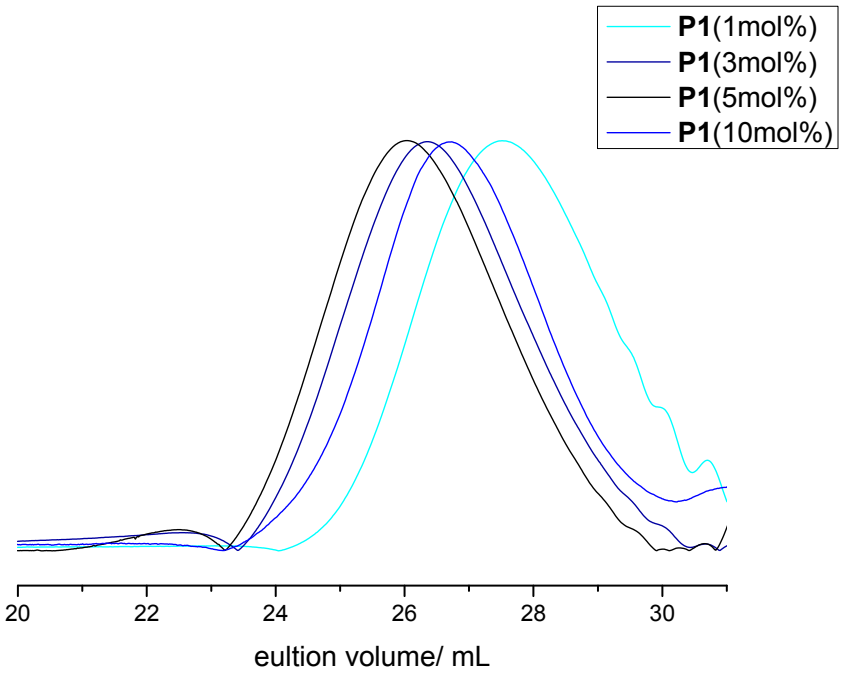

Fig. S 14. Representative GPC elugrams of **P1** with different catalyst loadings prepared by ADMET polycondensation.

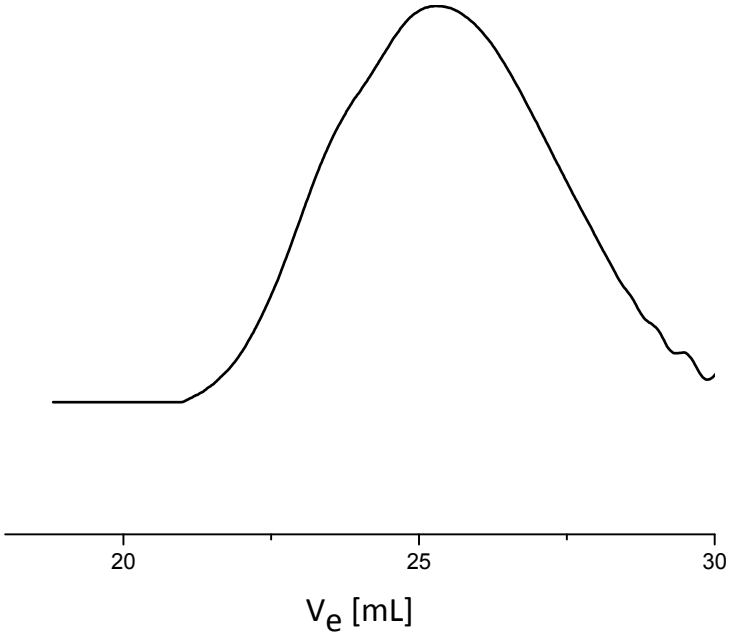

Fig. S15. Representative GPC elugram of Poly2 prepared by ADMET polycondensation.

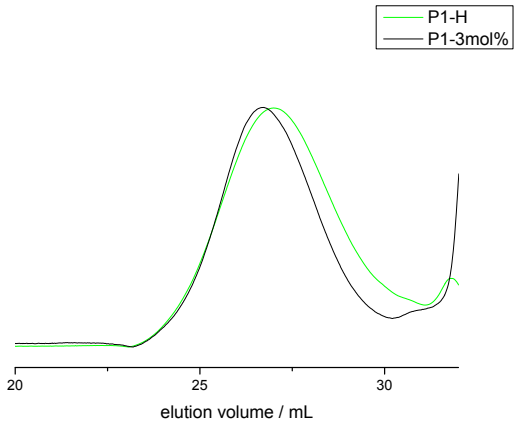

Fig S16: Overlay of SEC elugrams of P1 before and after hydrogenation.

Bulk properties

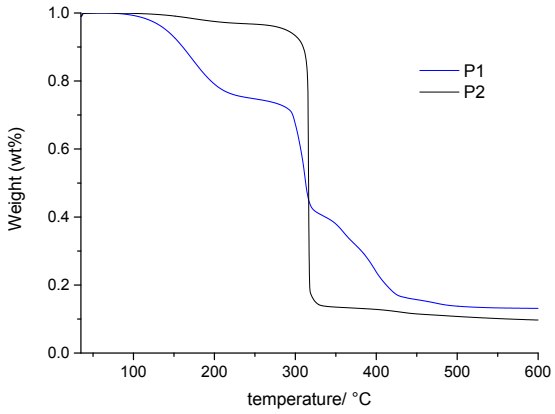

Fig. S17. TGA thermograms of P1 and P2.

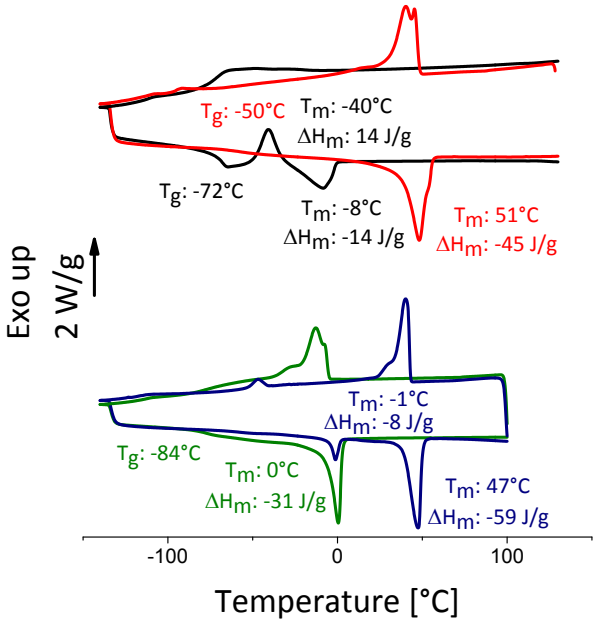

Figure S18. DSC thermograms of (a) P1 (black) and P1-H (red). (b) P2 (green) and P2-H (blue). Both experiments were performed at a heating/cooling rate of 10°C/min.

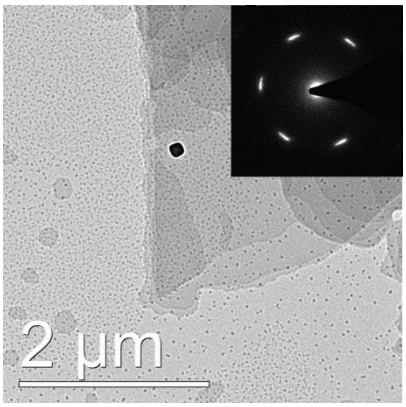

Figure S19: TEM micrograph and the corresponding diffraction pattern of solution crystallized P1-H.

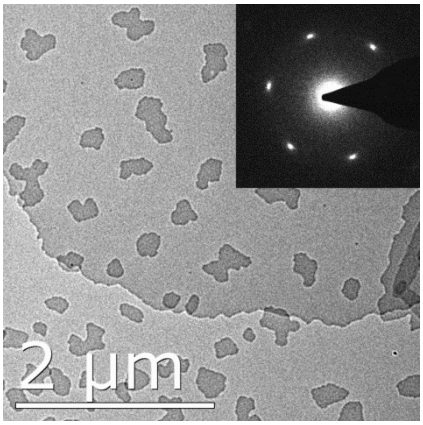

Figure S20: TEM micrograph and the corresponding diffraction pattern (inset) of solution crystallized P2-H.

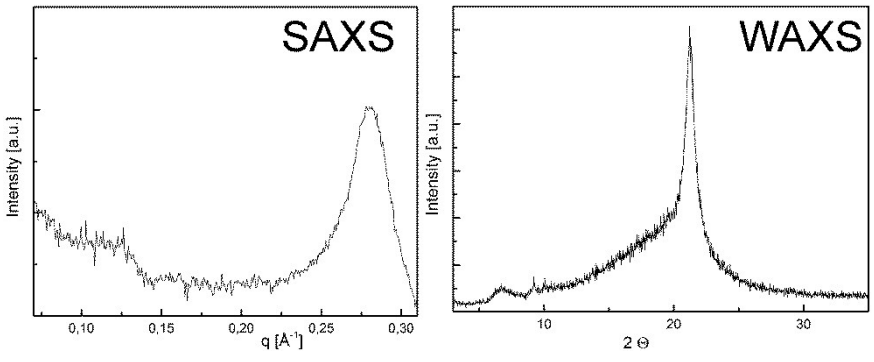

Figure S21: SAXS and WAXS measurements of P2-H samples. Prior to the x-ray measurement the sample was annealed at 42 °C for 24 hours.