

Supporting Information

Introducing a 1,1-diphenylethylene analogue for vinylpyridine: anionic copolymerisation of 3-(1-phenylvinyl)pyridine (*m*-PyPE)

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m-PyPE characterization

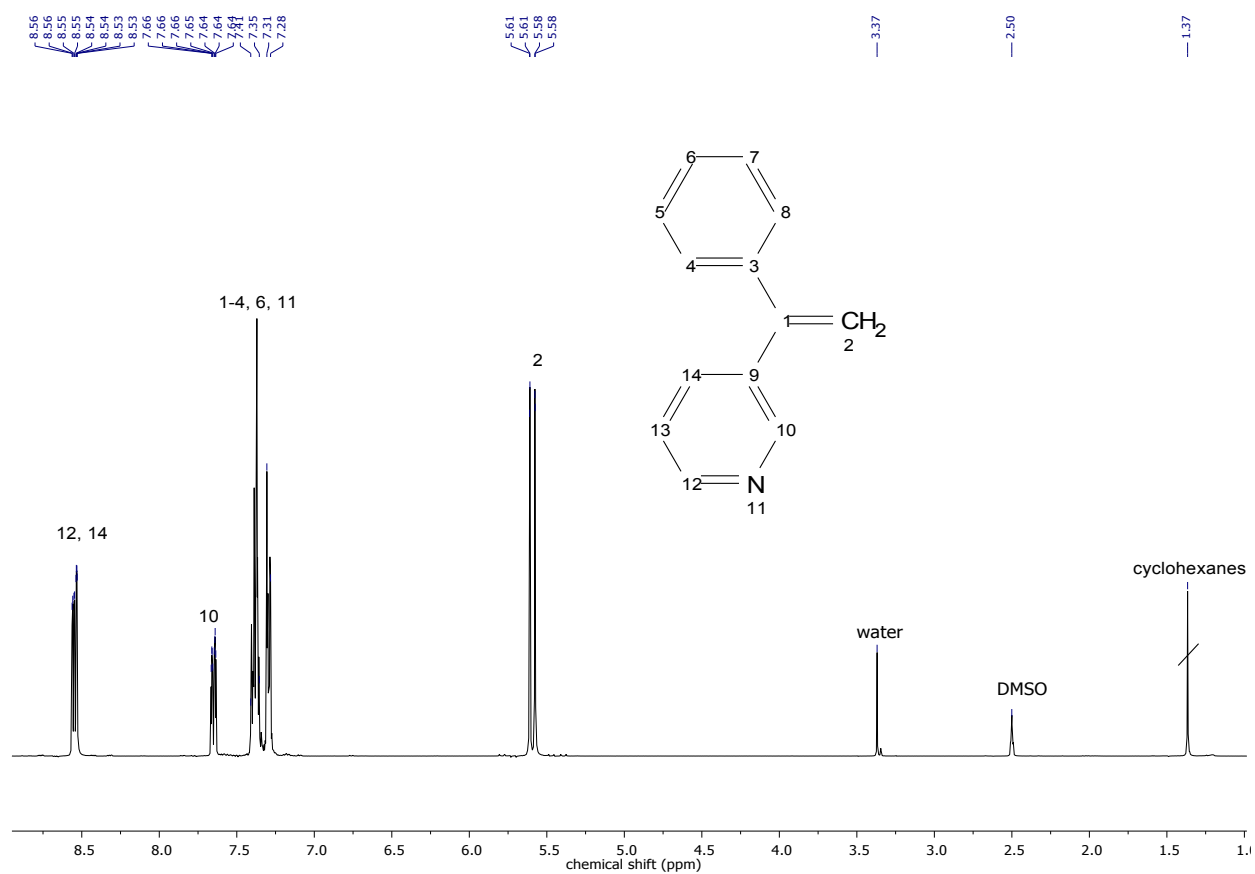


Figure S1: ¹H NMR spectrum (400 MHz, DMSO-d₆) of *m*-PyPE.

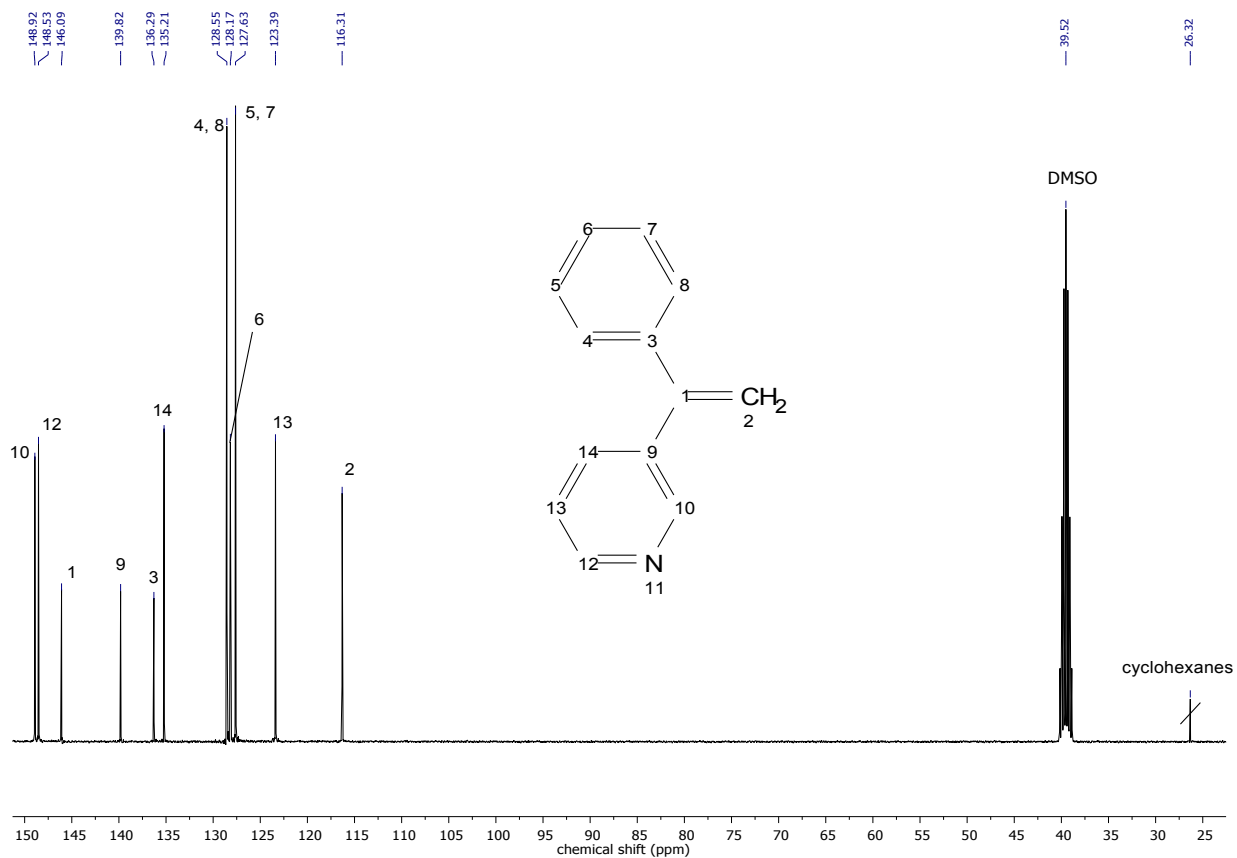


Figure S2: ¹³C NMR spectrum (400 MHz, DMSO-d₆) of *m*-PyPE.

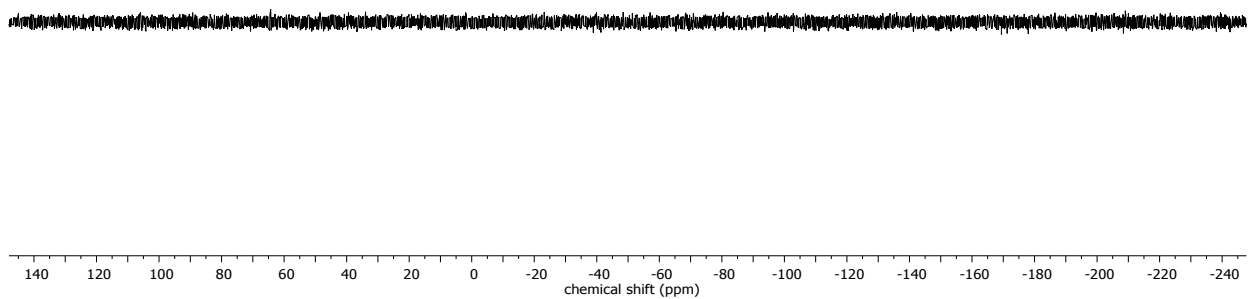


Figure S3: ³¹P NMR spectrum (400 MHz, DMSO-d₆) of *m*-PyPE, showing the absence of TPPO.

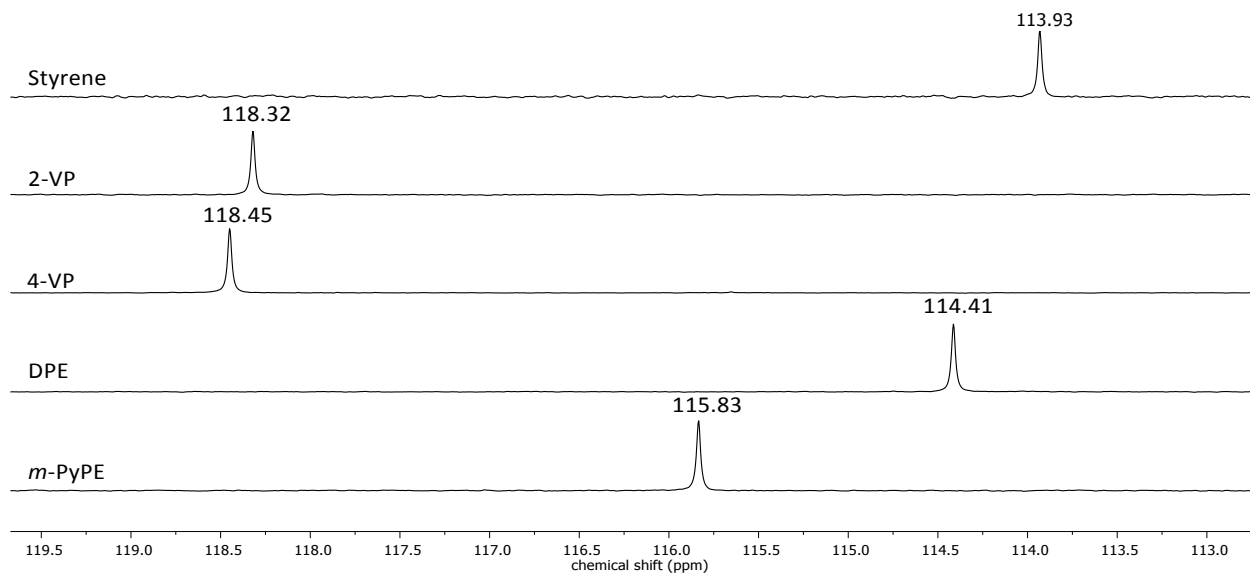


Figure S4: ^{13}C NMR spectrum (400 MHz, CDCl_3) of different monomers, showing the respective β -carbon shifts.

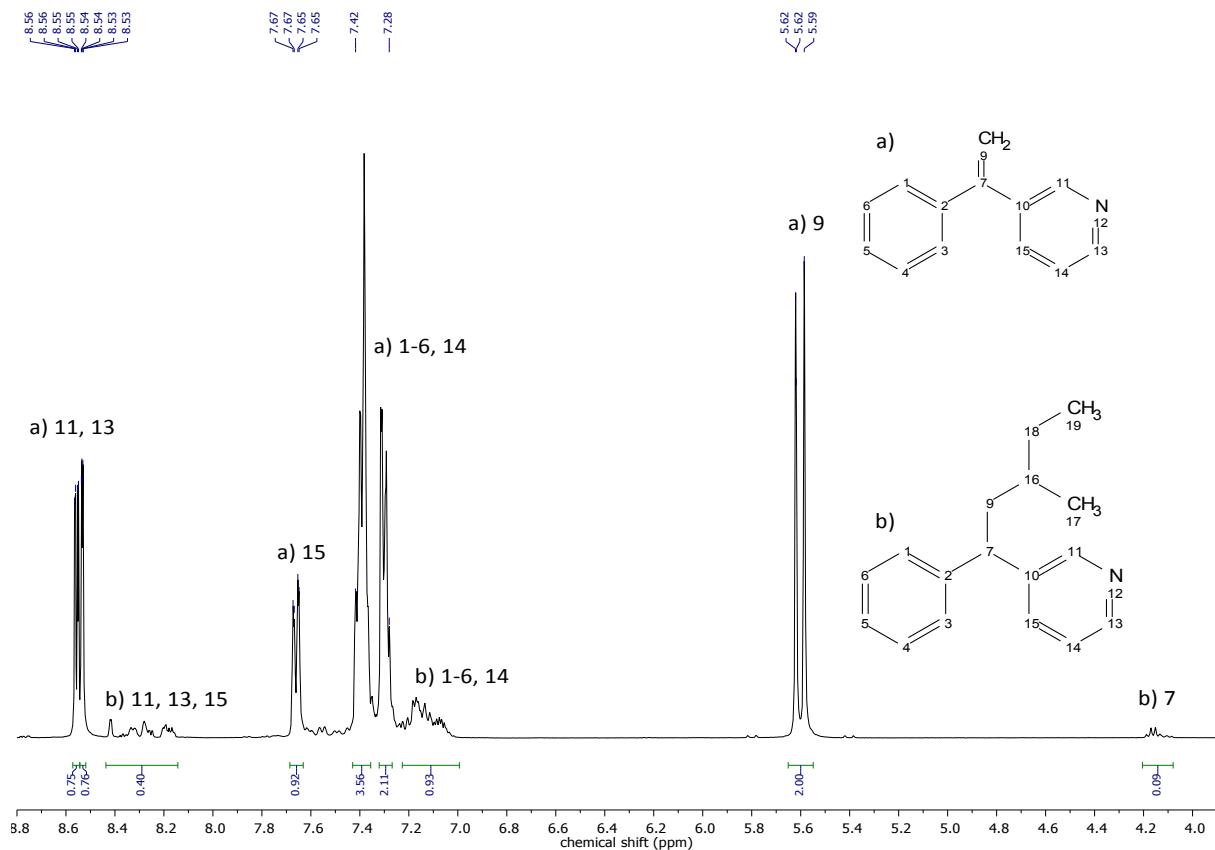


Figure S5: ^1H NMR spectrum (400 MHz, DMSO-d_6) of *s*-BuLi initiated *m*-PyPE, showing only the addition of the butyl group and no polymerization products.

Copolymer NMR characterization

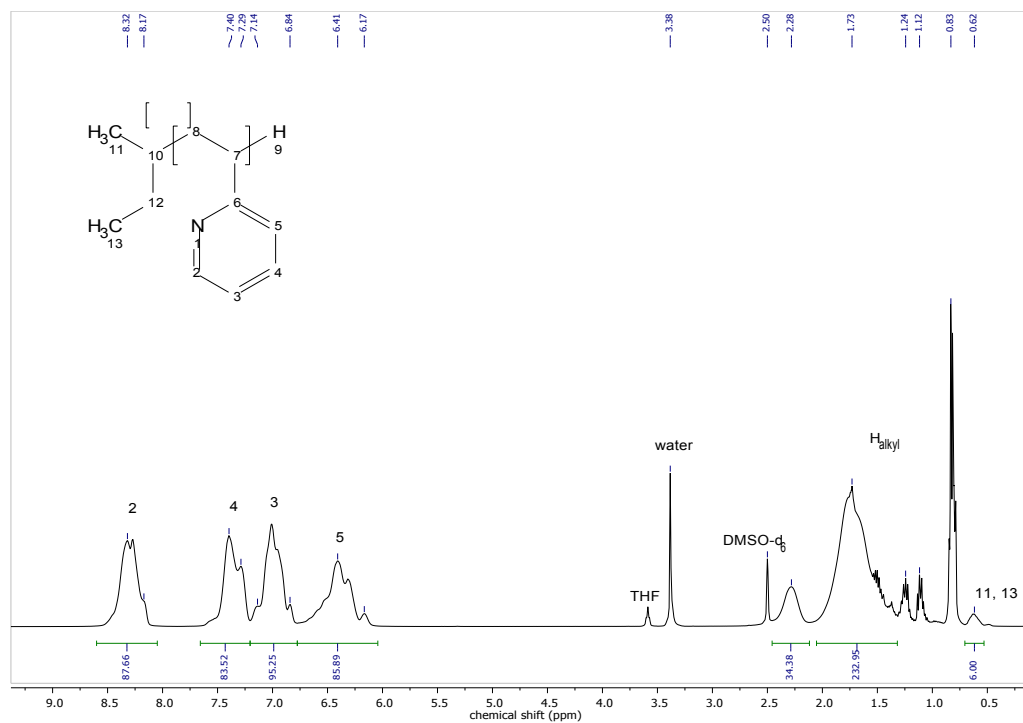


Figure S6: ¹H NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP).

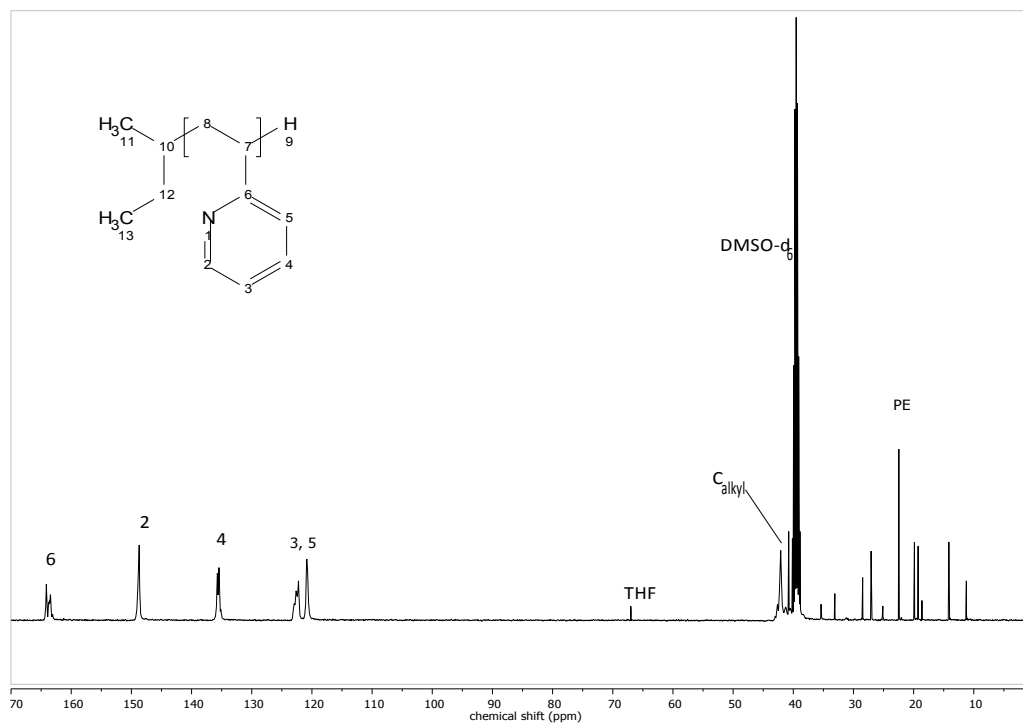


Figure S7: IG ¹³C NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP).

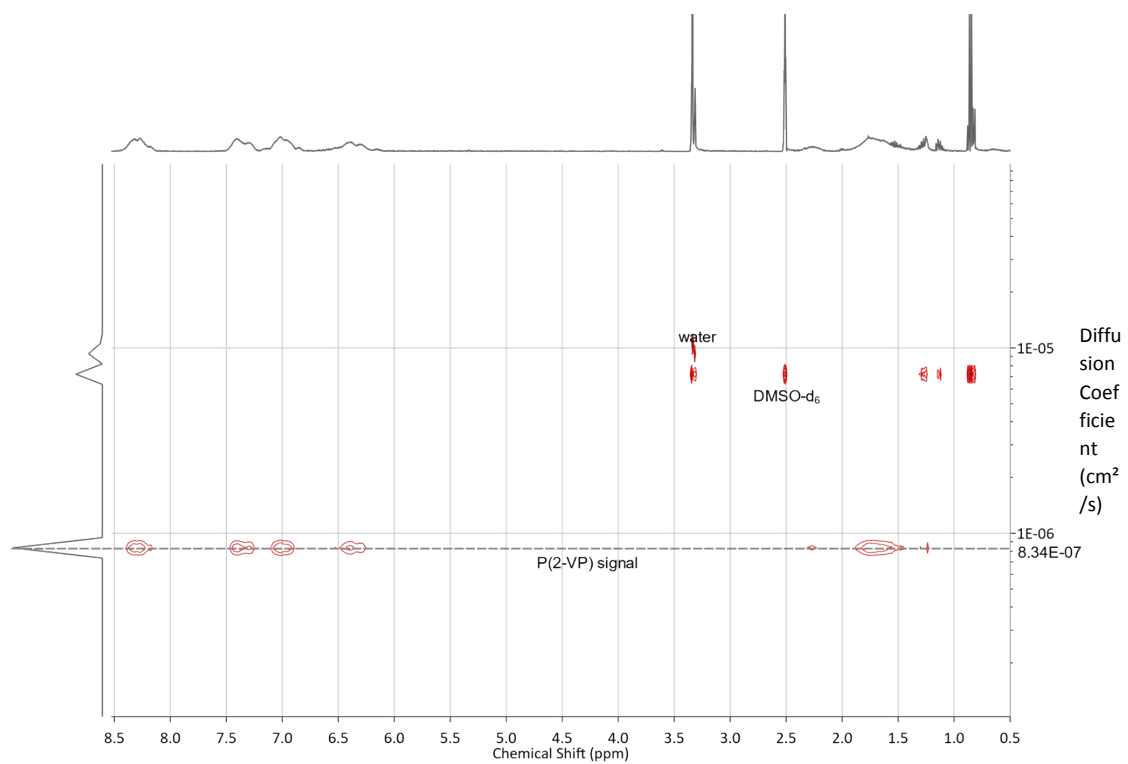


Figure S8: DOSY NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP).

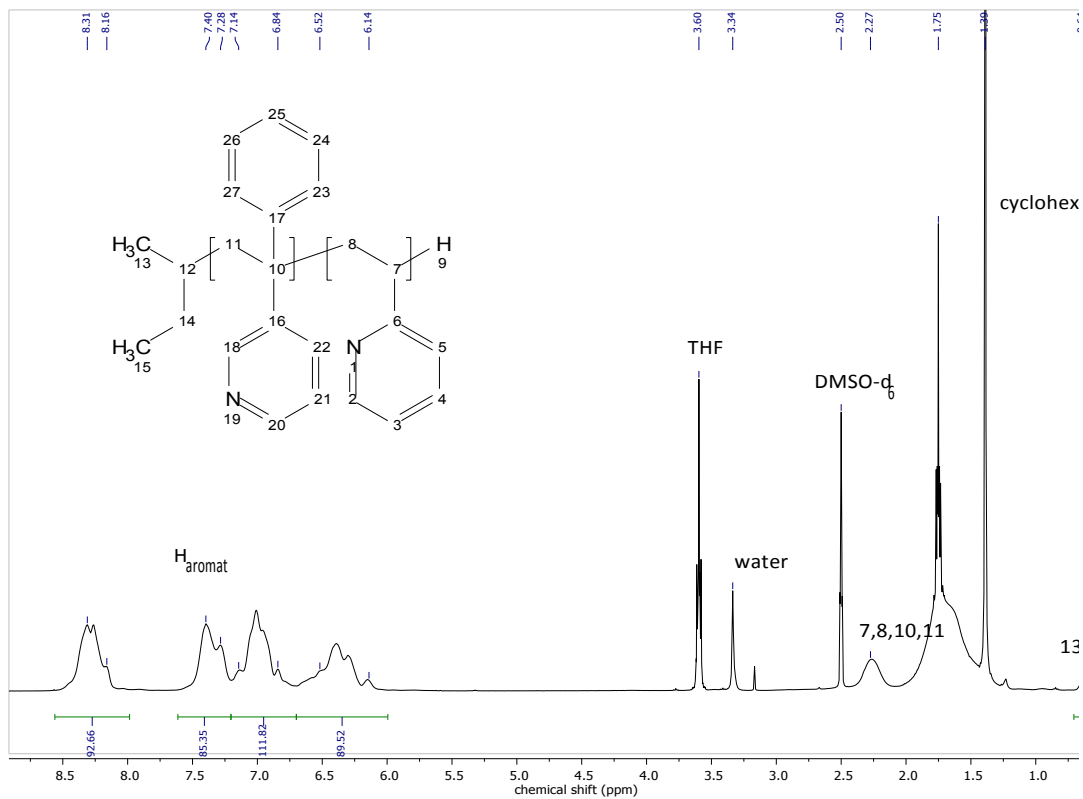


Figure S9: ¹H NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 5% *m*-PyPE.

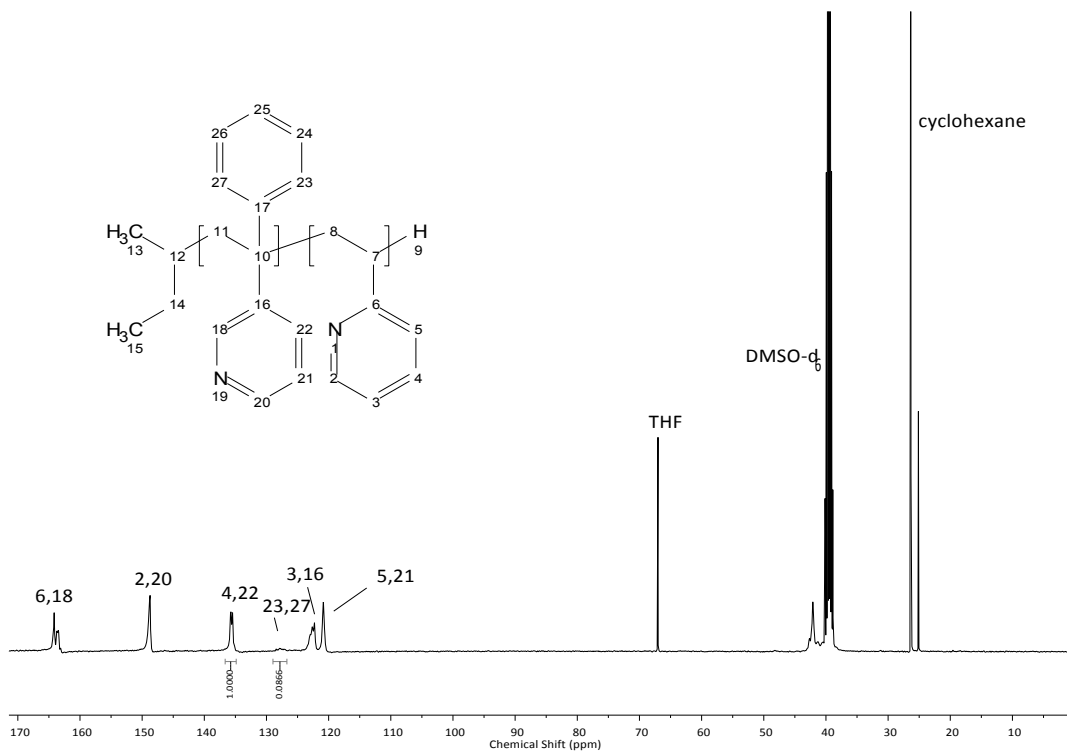


Figure S10: IG ¹³C NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 5% *m*-PyPE.

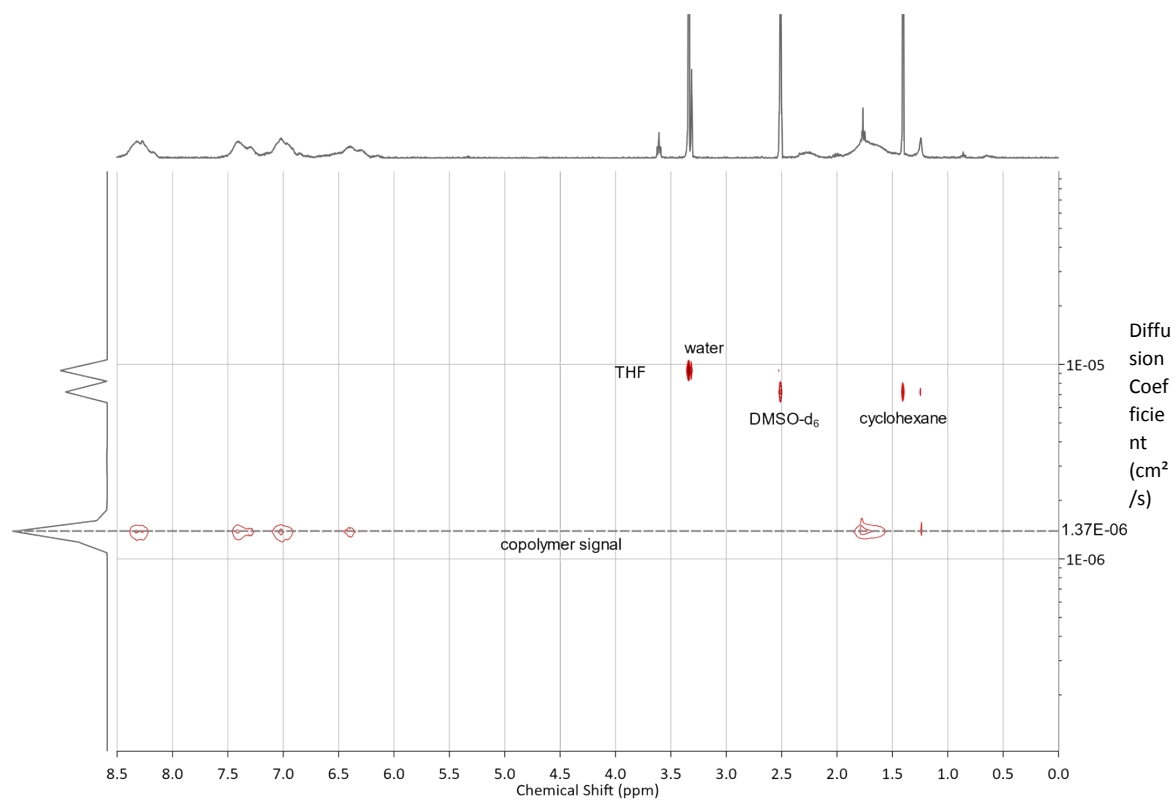


Figure S11: DOSY NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 5% *m*-PyPE.

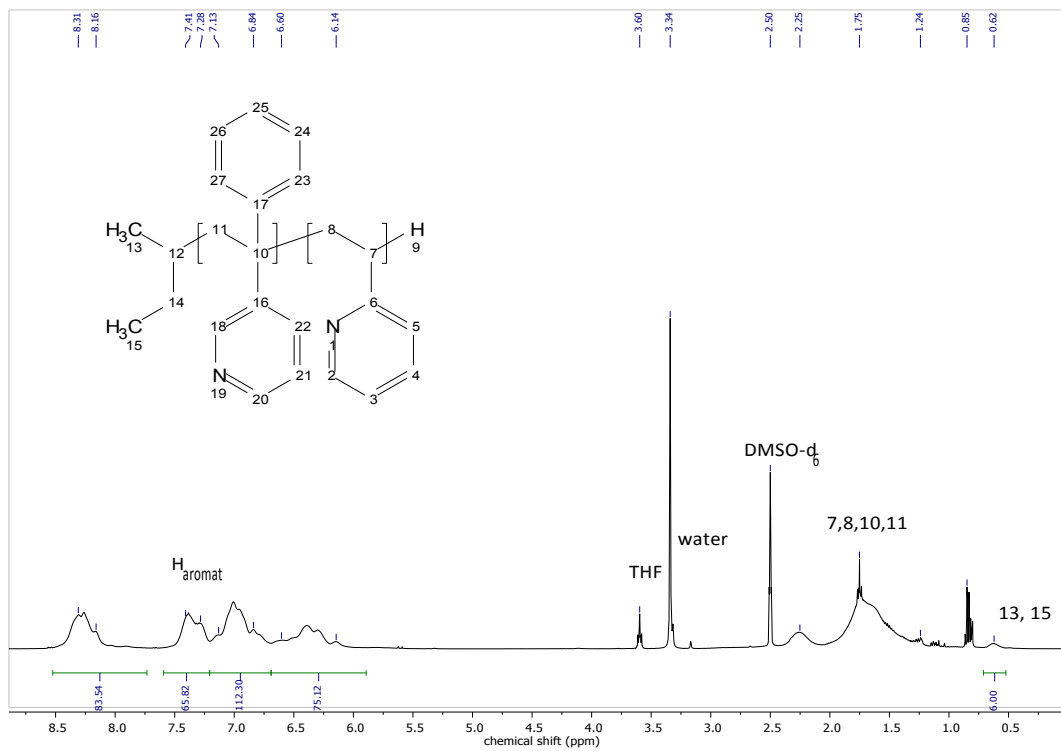


Figure S12: ^1H NMR spectrum (DMSO- d_6 , 400 MHz) of P(2-VP-stat-*m*-PyPE); 10% *m*-PyPE.

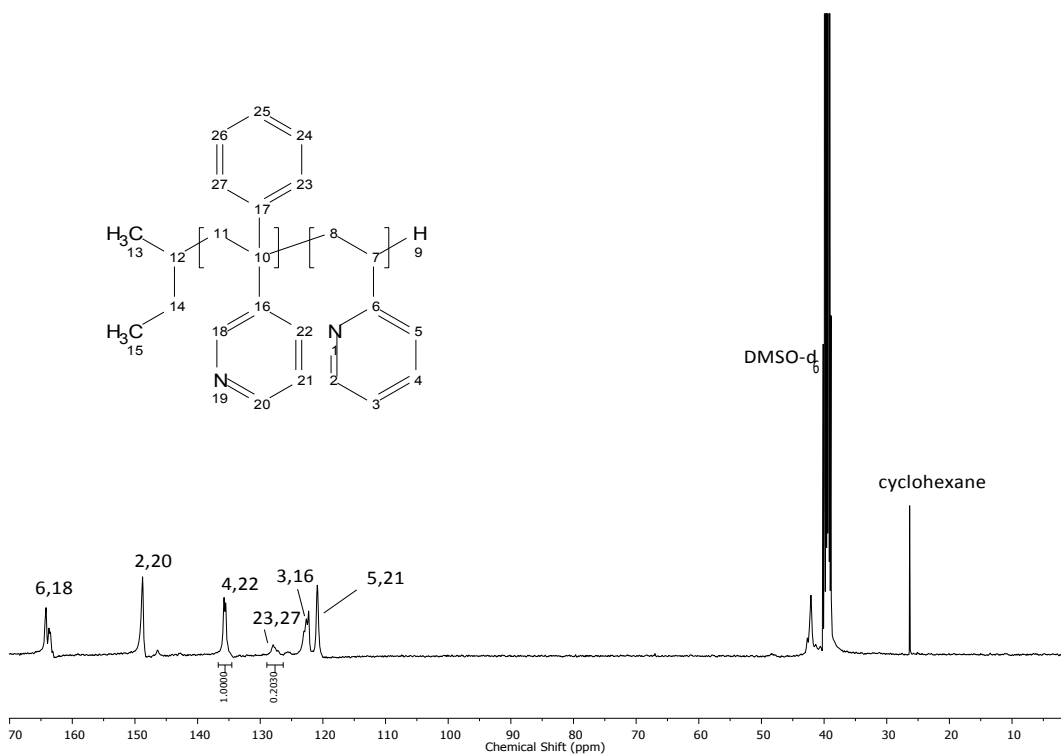


Figure S13: IG ^{13}C NMR spectrum (DMSO- d_6 , 400 MHz) of P(2-VP-stat-*m*-PyPE); 10% *m*-PyPE.

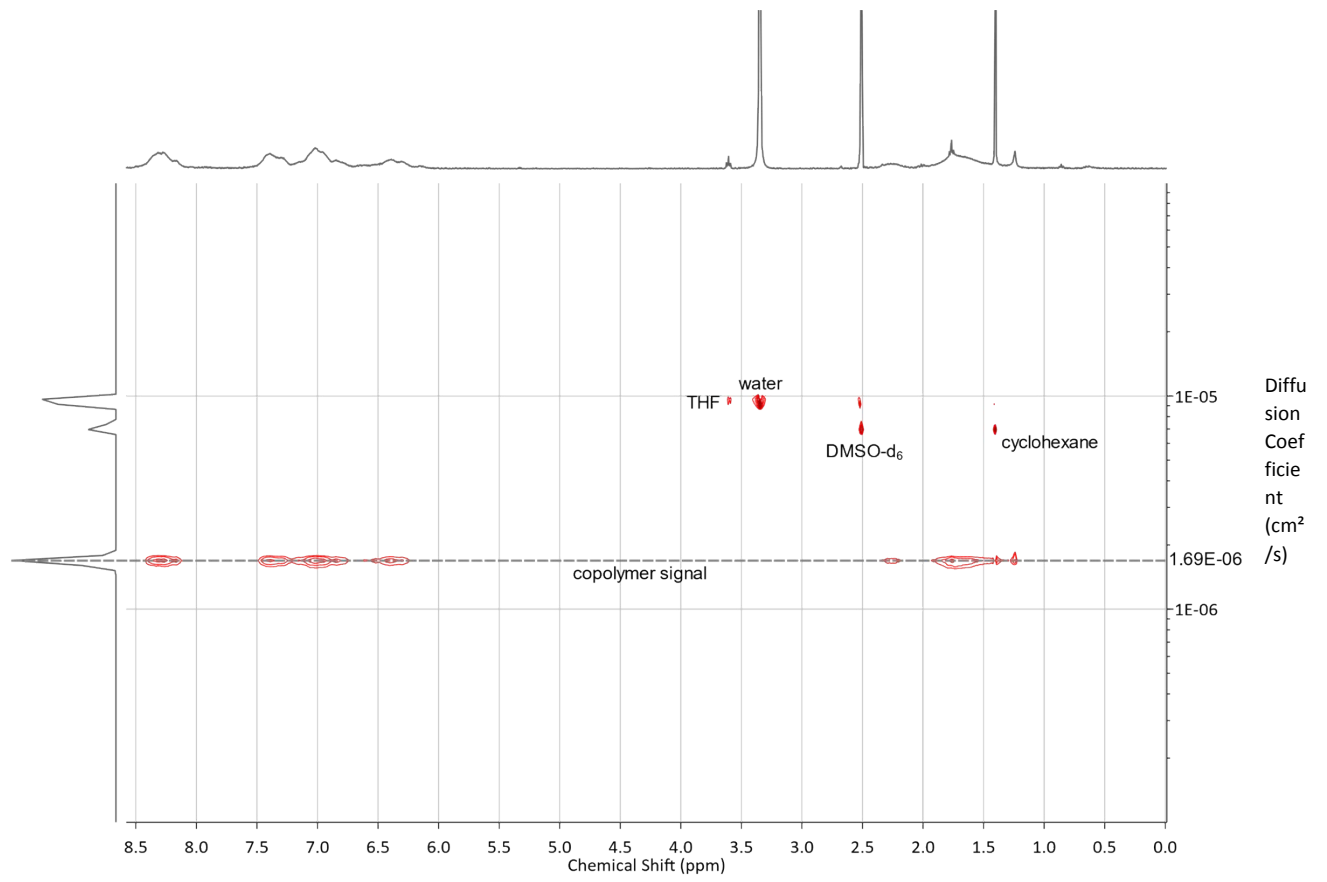


Figure S14: DOSY NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 10% *m*-PyPE.

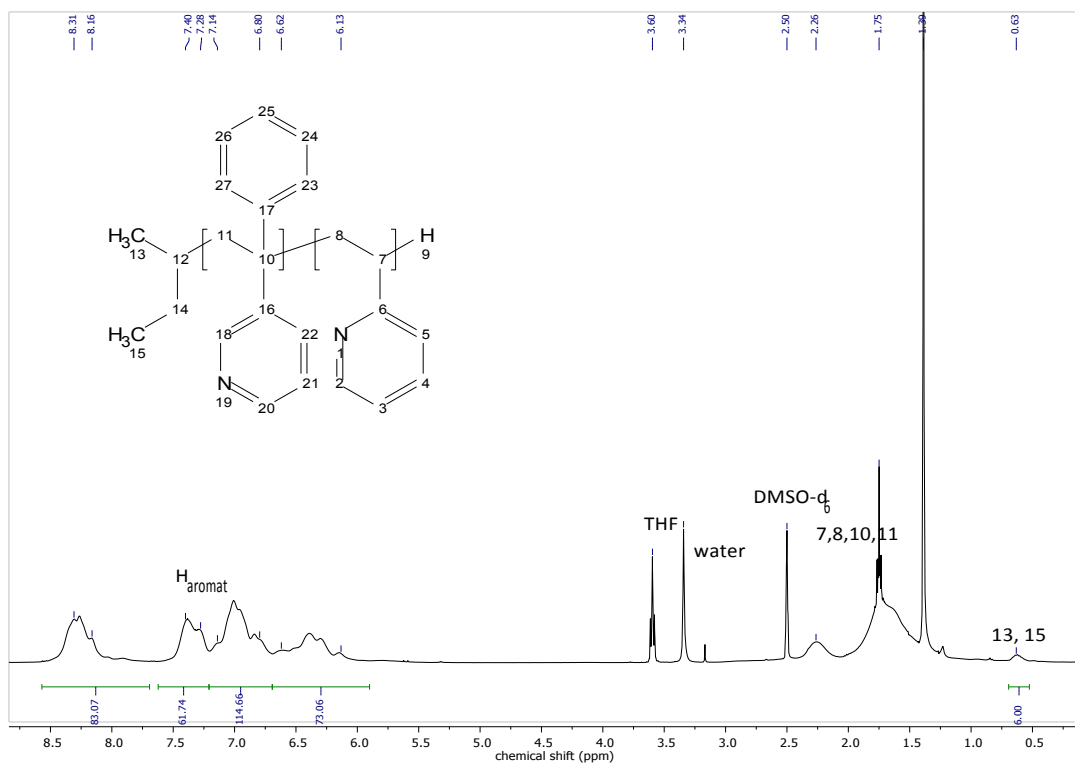


Figure S15: ^1H NMR spectrum (DMSO- d_6 , 400 MHz) of P(2-VP-stat-*m*-PyPE); 15% *m*-PyPE.

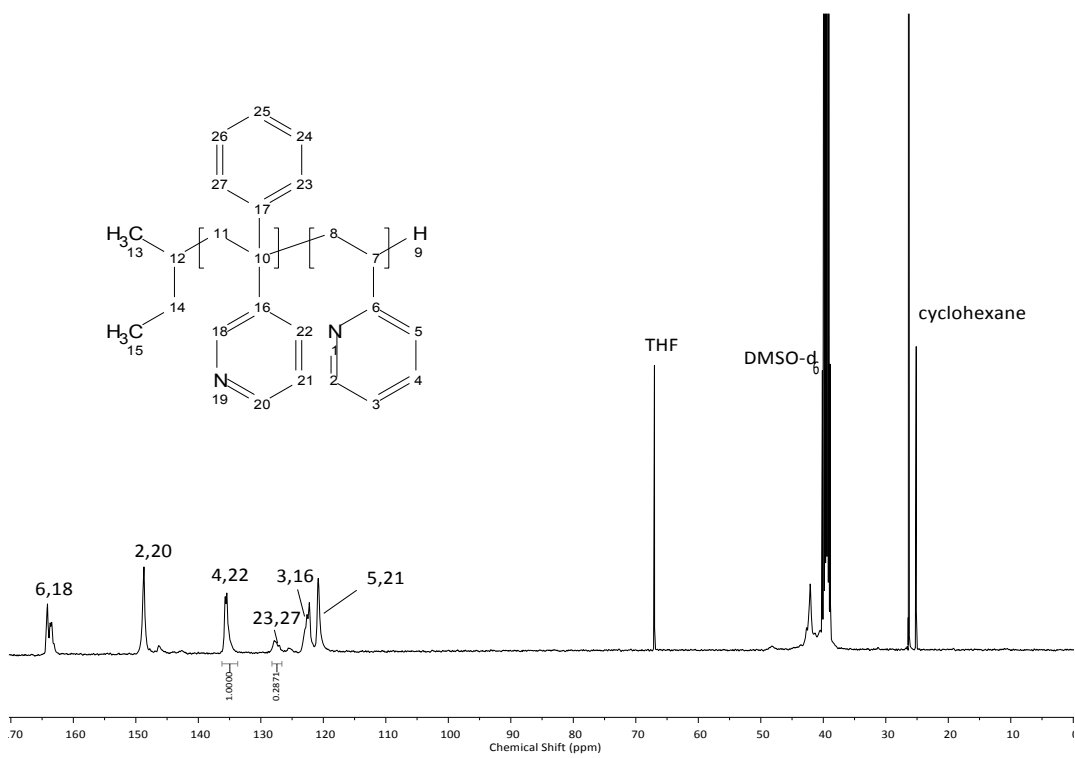


Figure S16: IG ^{13}C NMR spectrum (DMSO- d_6 , 400 MHz) of P(2-VP-stat-*m*-PyPE); 15% *m*-PyPE.

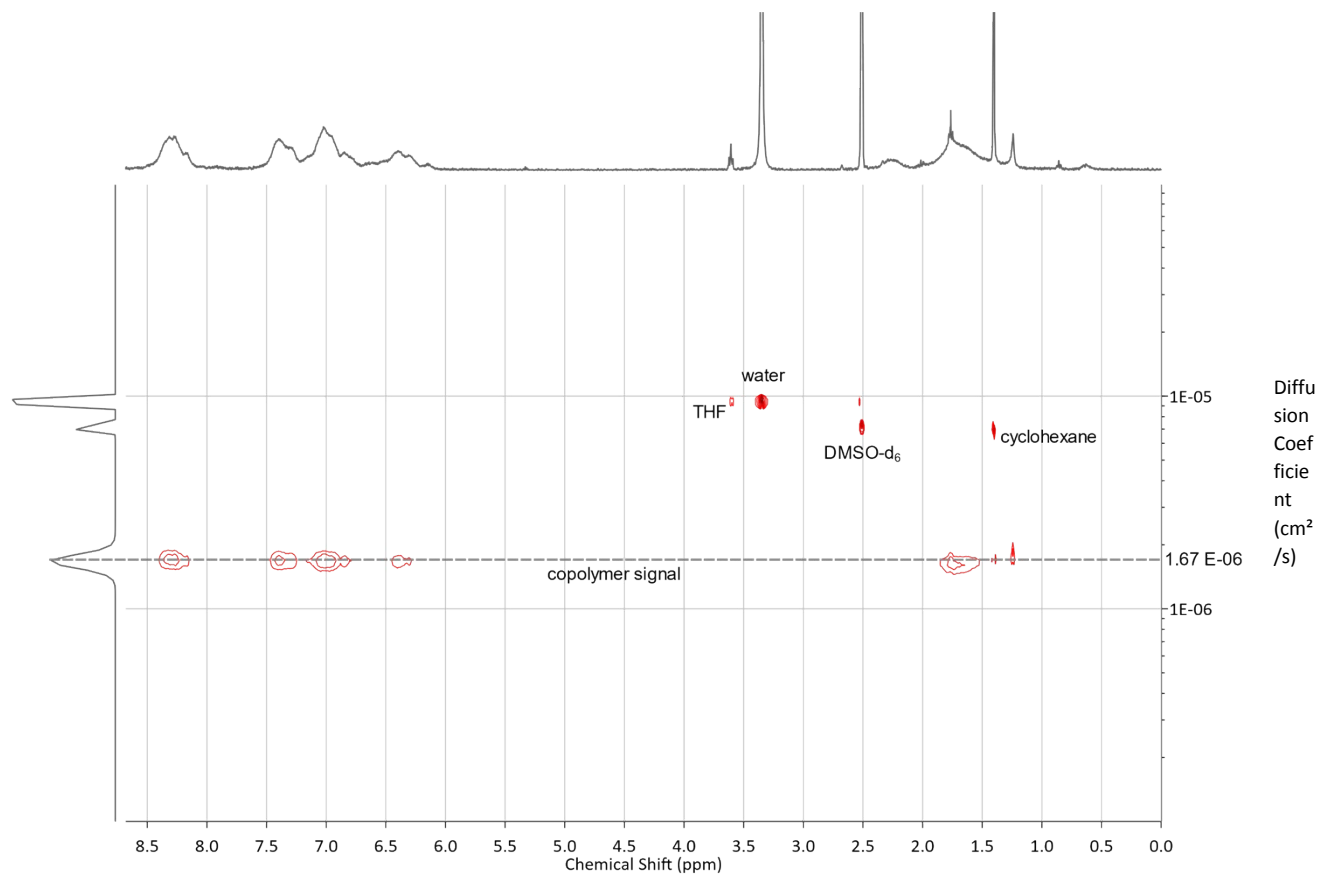


Figure S17: Figure S15: IG ^{13}C NMR spectrum (DMSO- d_6 , 400 MHz) of P(2-VP-stat-*m*-PyPE); 15% *m*-PyPE.

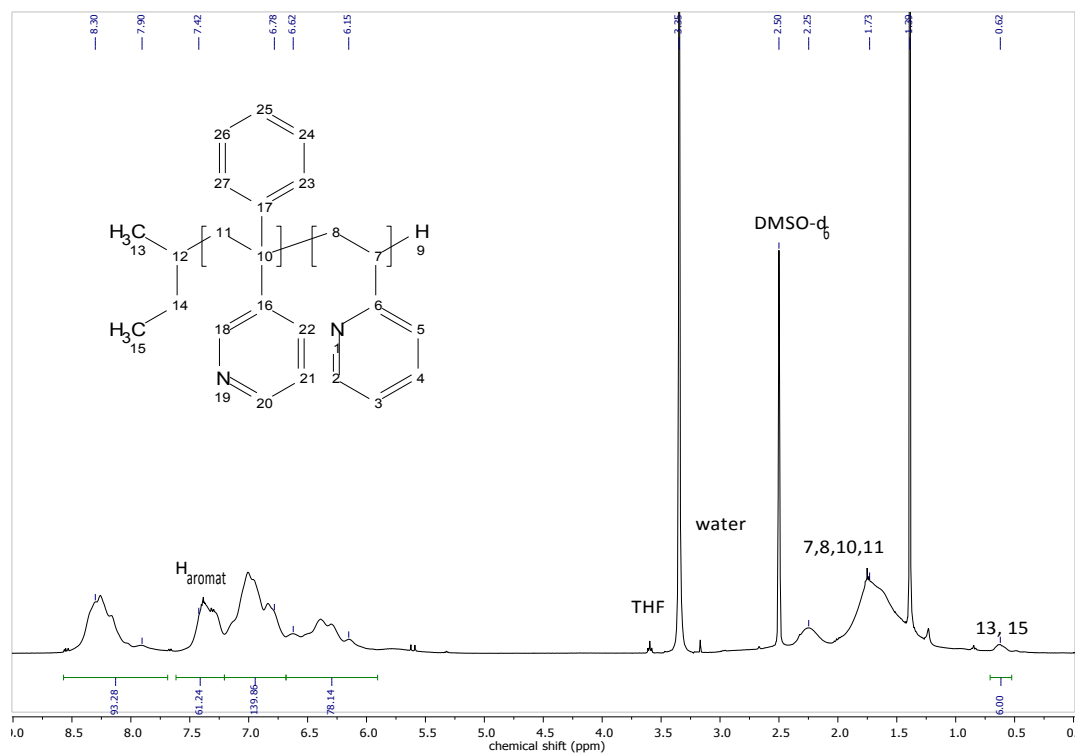


Figure S18: ¹H NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 20% *m*-PyPE.

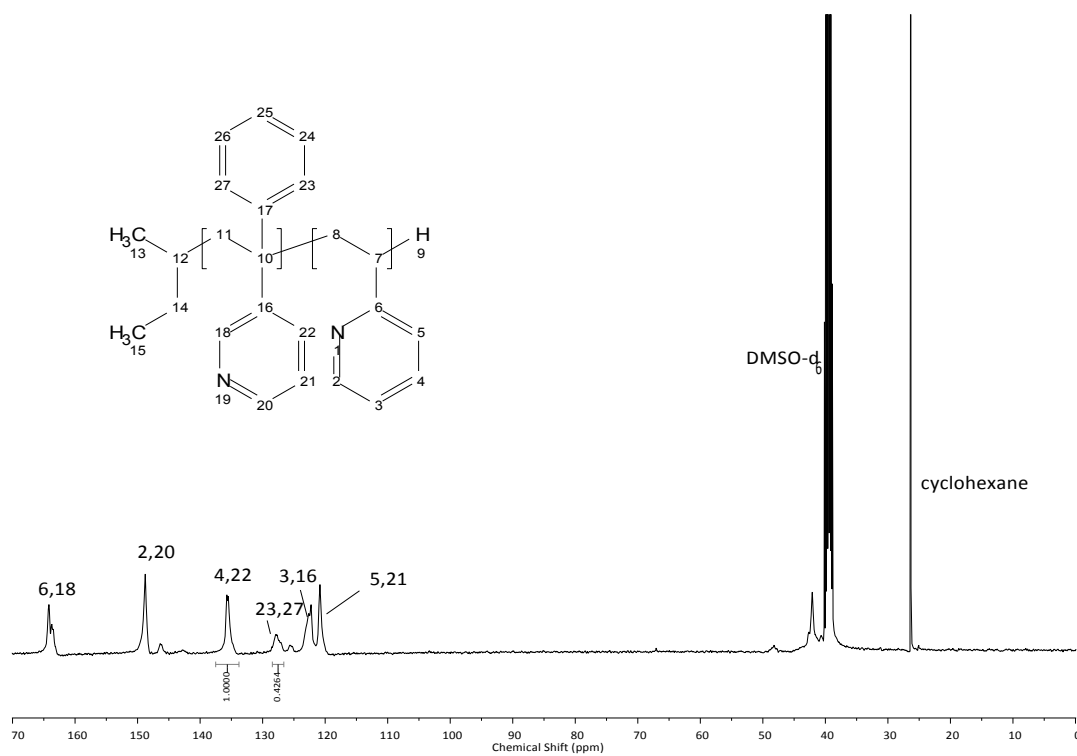


Figure S19: IG ¹³C NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 20% *m*-PyPE.

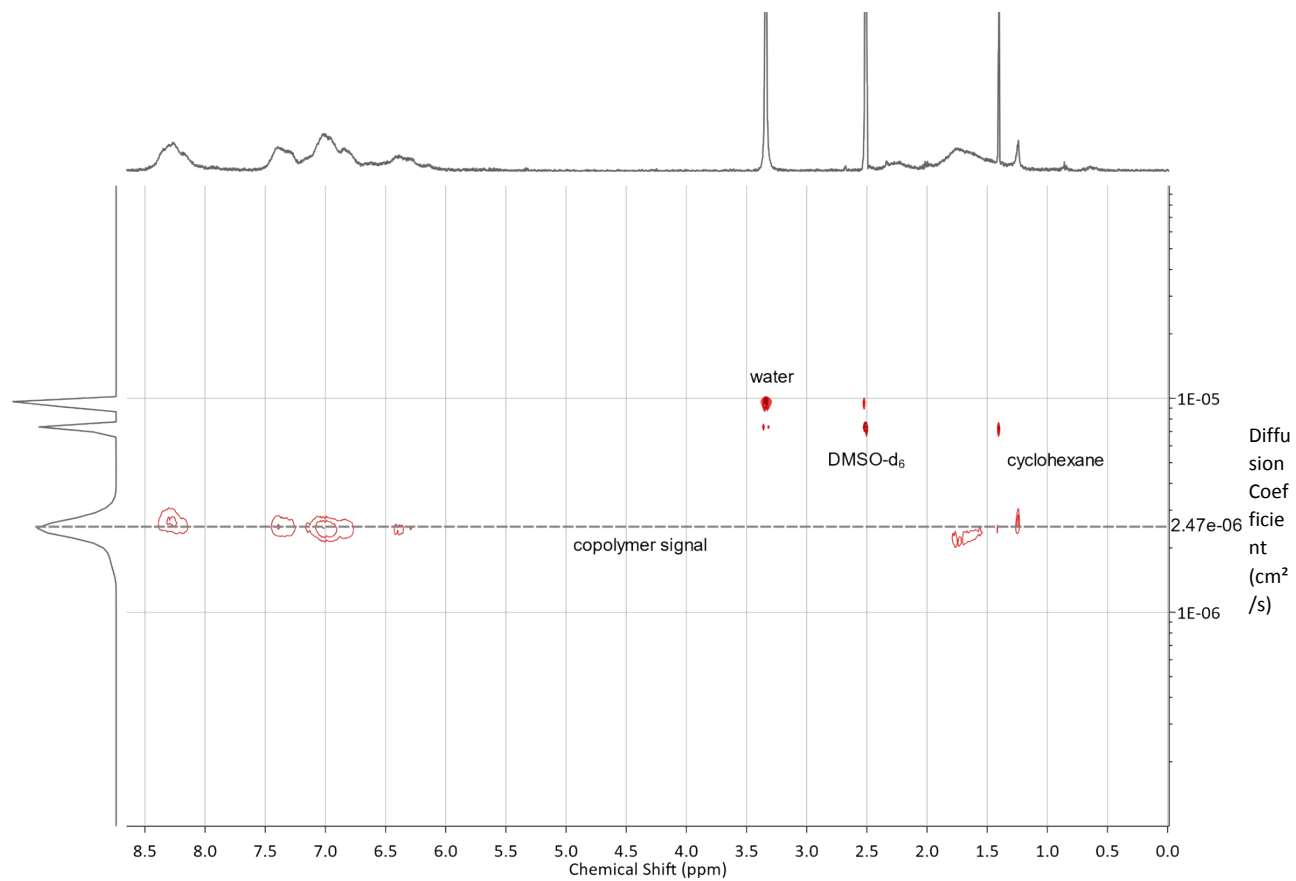


Figure S20: DOSY NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 20% *m*-PyPE.

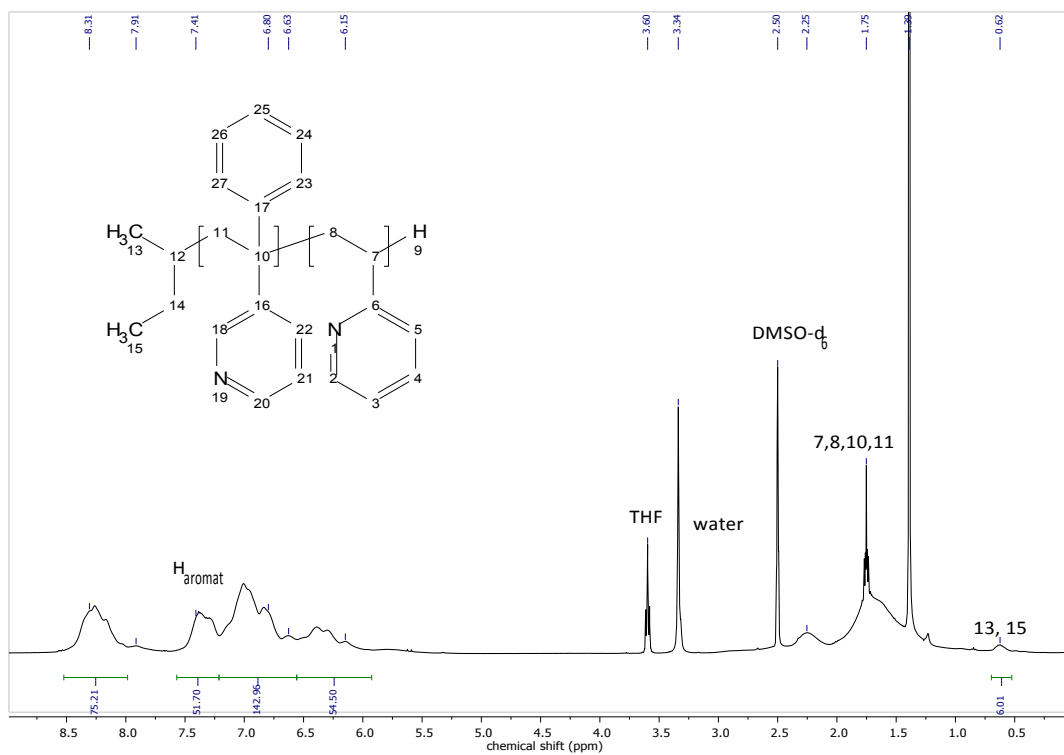


Figure S21: ¹H NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 25% *m*-PyPE.

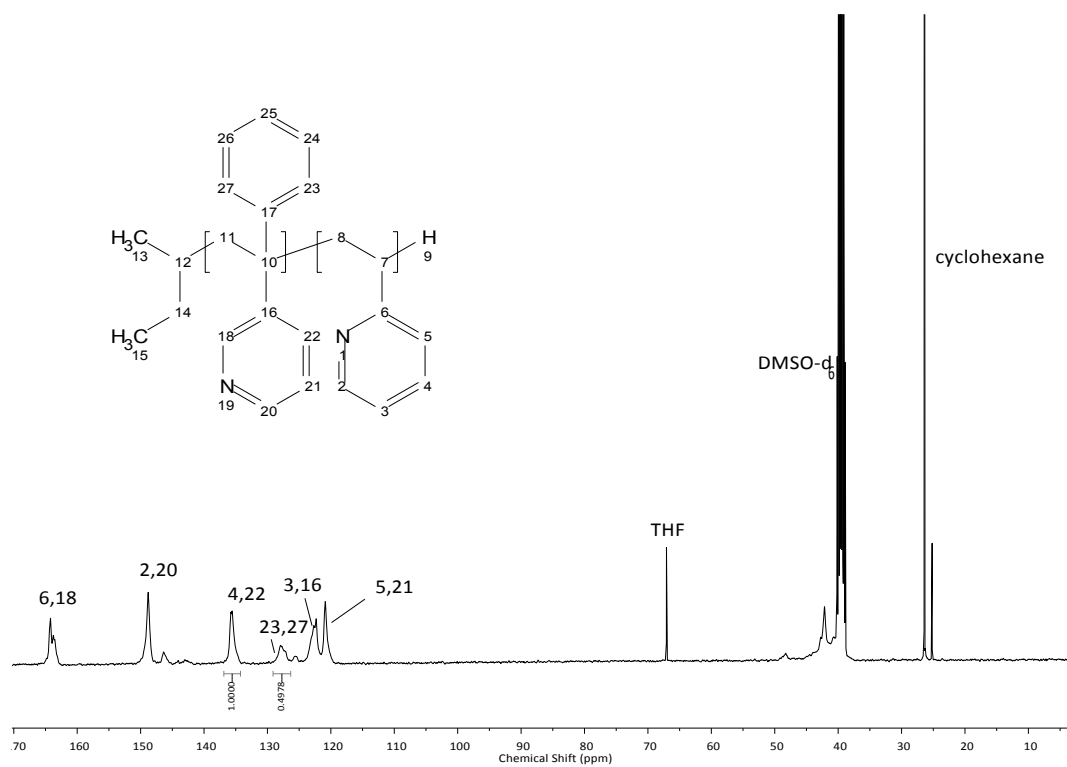


Figure S22: IG ¹³C NMR spectrum (DMSO-d₆, 400 MHz) of P(2-VP-stat-*m*-PyPE); 25% *m*-PyPE.

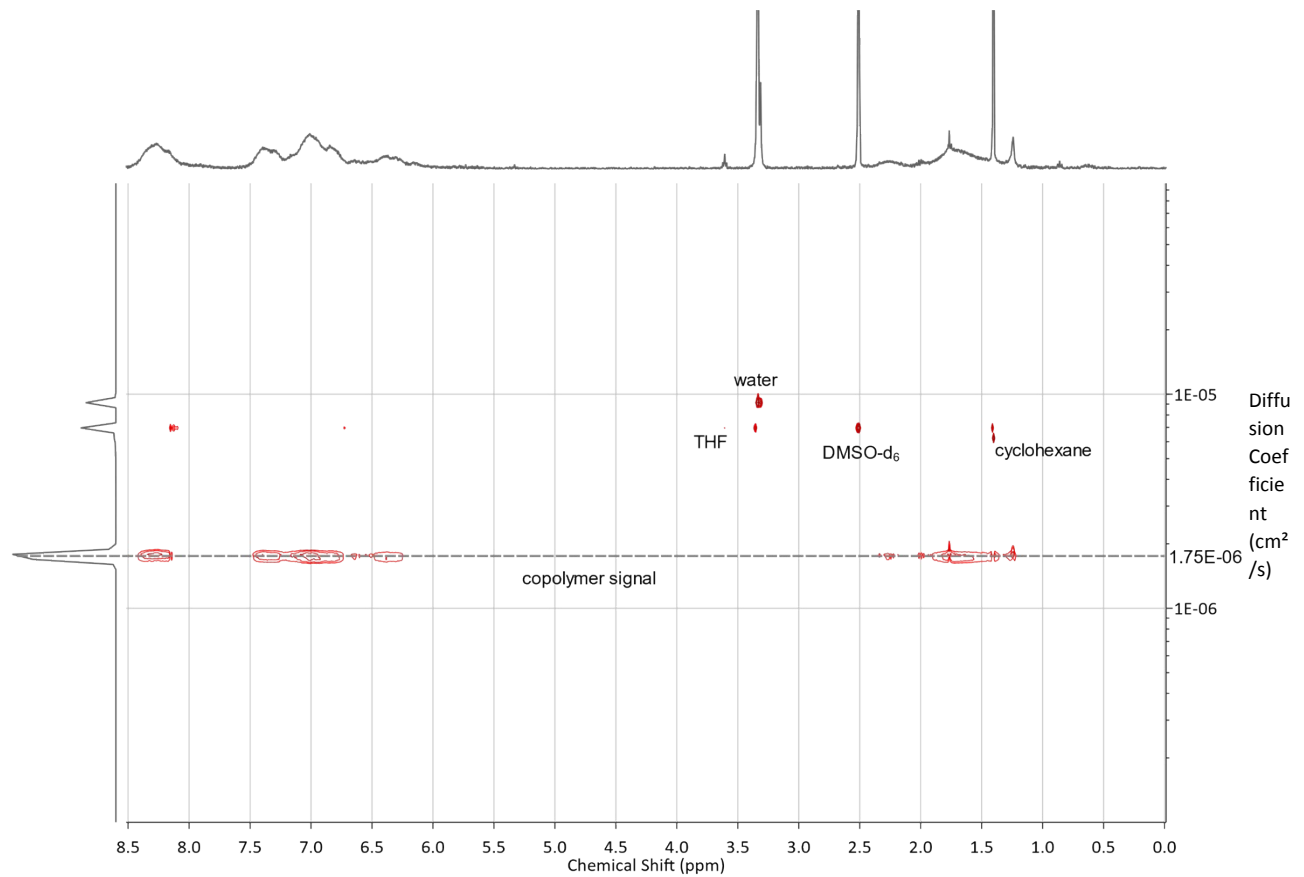


Figure S23: DOSY NMR spectrum (DMSO- d_6 , 400 MHz) of P(2-VP-*stat*-*m*-PyPE); 25% *m*-PyPE.

Calculation of the overall copolymer composition

To facilitate the comparability of the physical values, the content of *m*PyPE with respect to the overall composition of the copolymers was calculated from the IG ^{13}C NMR spectra, in addition to the 2-VP/*m*-PyPE ratio. We used equation S1, where $I(\#)$ resembles the 2-VP signal, normalized to 1, and $I(*)$ represents the respective *m*-PyPE signal of the polymers.

$$\text{mol\%m-PyPE}_{\text{calcb}} = \frac{0.5 \cdot I(*)}{I(\#) + 0.5 \cdot I(*)} = \frac{0.5 \cdot I(*)}{1 + 0.5 \cdot I(*)} \quad (\text{S1})$$

Differential scanning calorimetry (DSC)

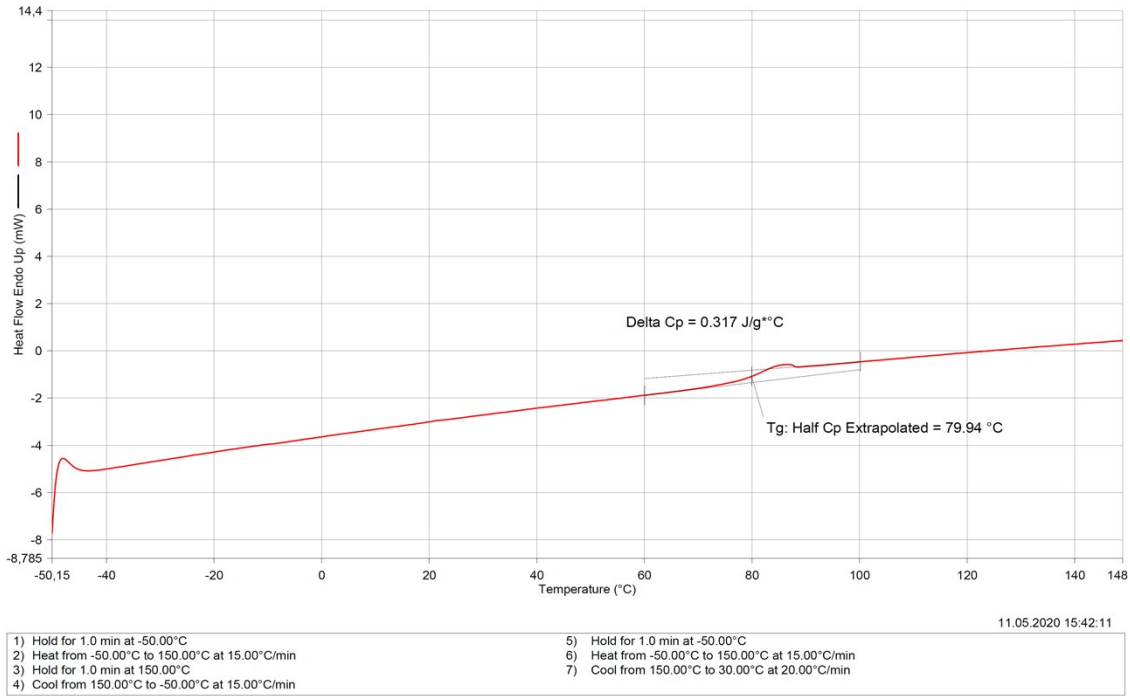


Figure S24: DSC curve of P(2-VP).

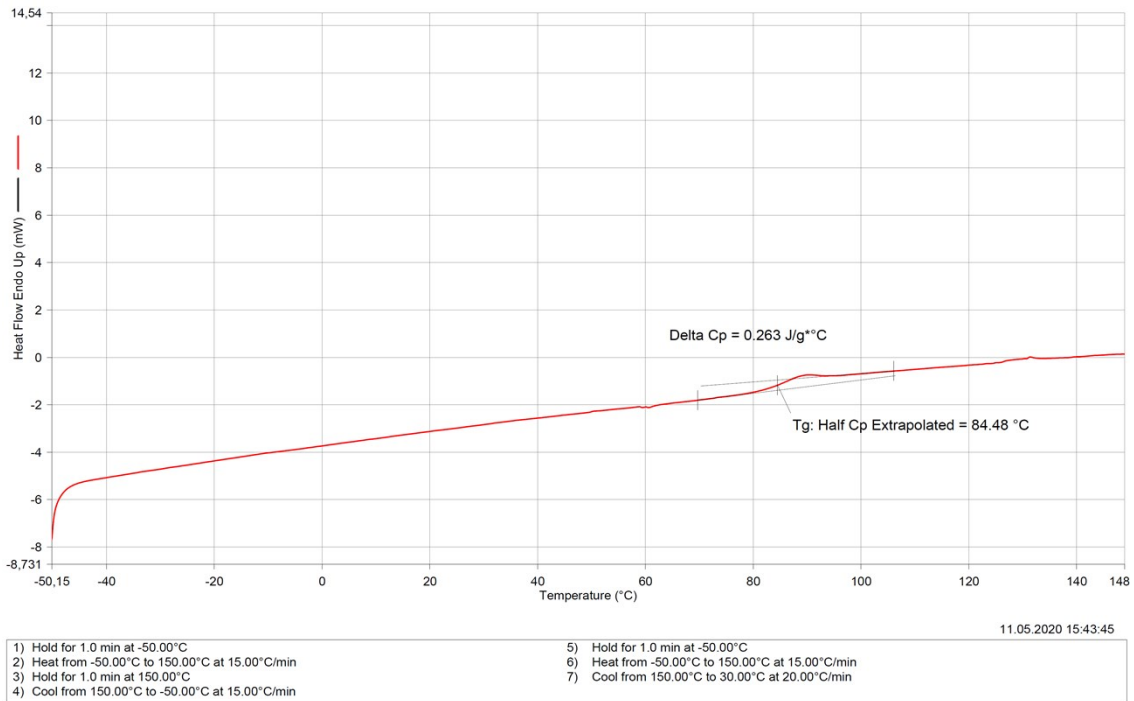
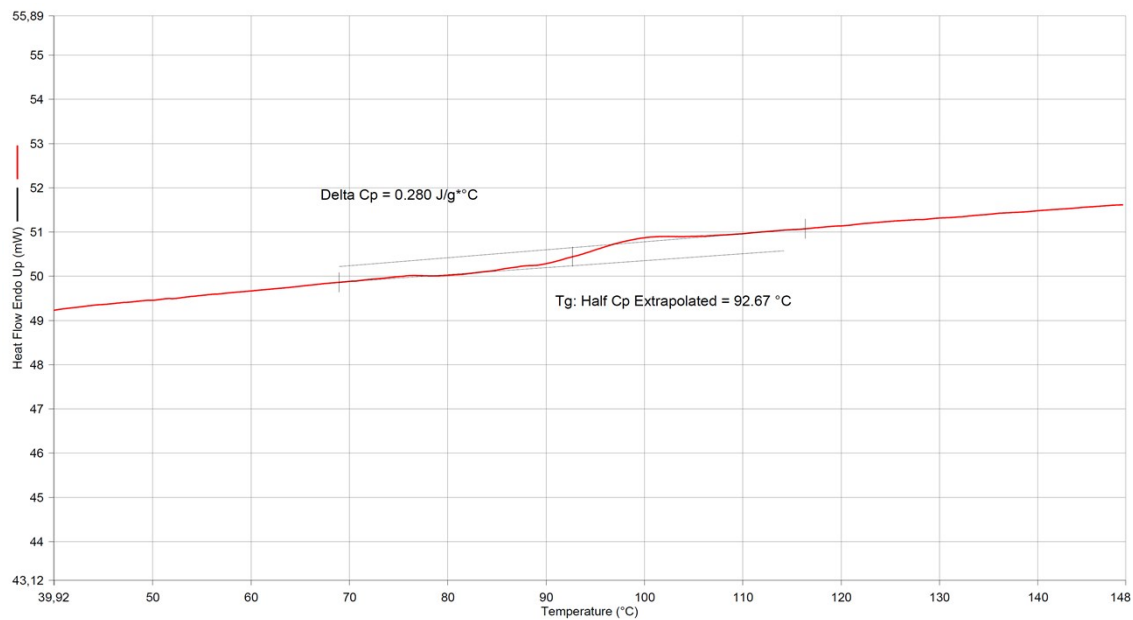


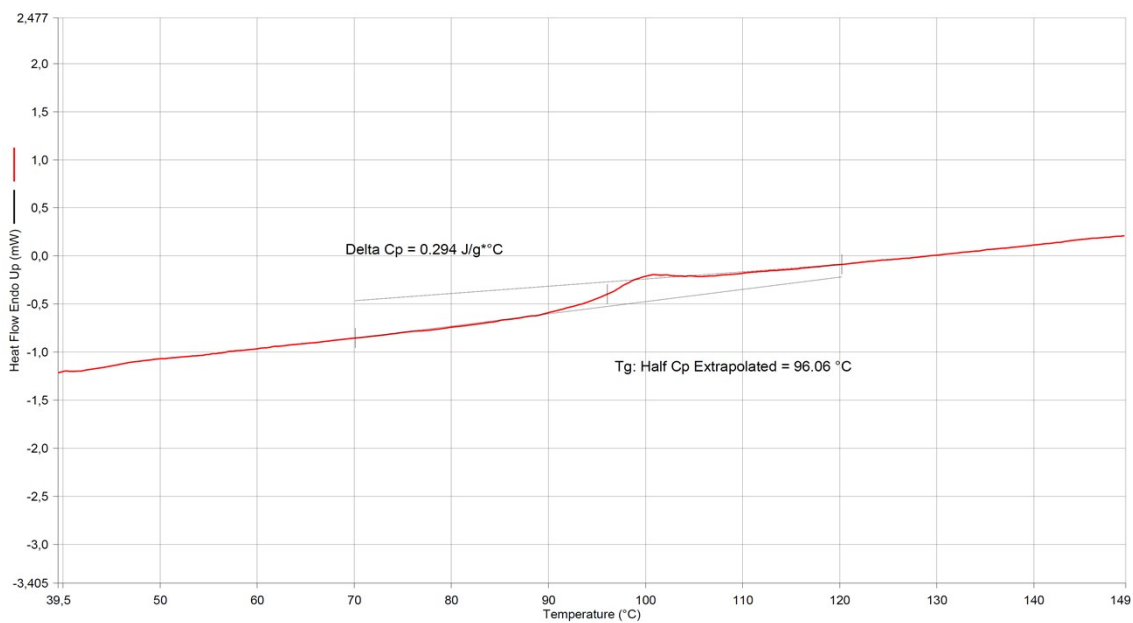
Figure S25: DSC curve of P(2-VP-stat-*m*-PyPE); 5% *m*-PyPE.



11.05.2020 16:10:08

- | | |
|---|---|
| 1) Heat from 30.00°C to 150.00°C at 20.00°C/min | 4) Hold for 2.0 min at 30.00°C |
| 2) Hold for 1.0 min at 150.00°C | 5) Heat from 30.00°C to 150.00°C at 20.00°C/min |
| 3) Cool from 150.00°C to 30.00°C at 20.00°C/min | |

Figure S26: DSC curve of P(2-VP-stat-*m*-PyPE); 10% *m*-PyPE.



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- | | |
|---|---|
| 1) Hold for 3.0 min at 30.00°C | 4) Cool from 150.00°C to 30.00°C at 10.00°C/min |
| 2) Heat from 30.00°C to 150.00°C at 20.00°C/min | 5) Hold for 3.0 min at 30.00°C |
| 3) Hold for 3.0 min at 150.00°C | 6) Heat from 30.00°C to 150.00°C at 10.00°C/min |

Figure S27: DSC curve of P(2-VP-stat-*m*-PyPE); 15% *m*-PyPE.

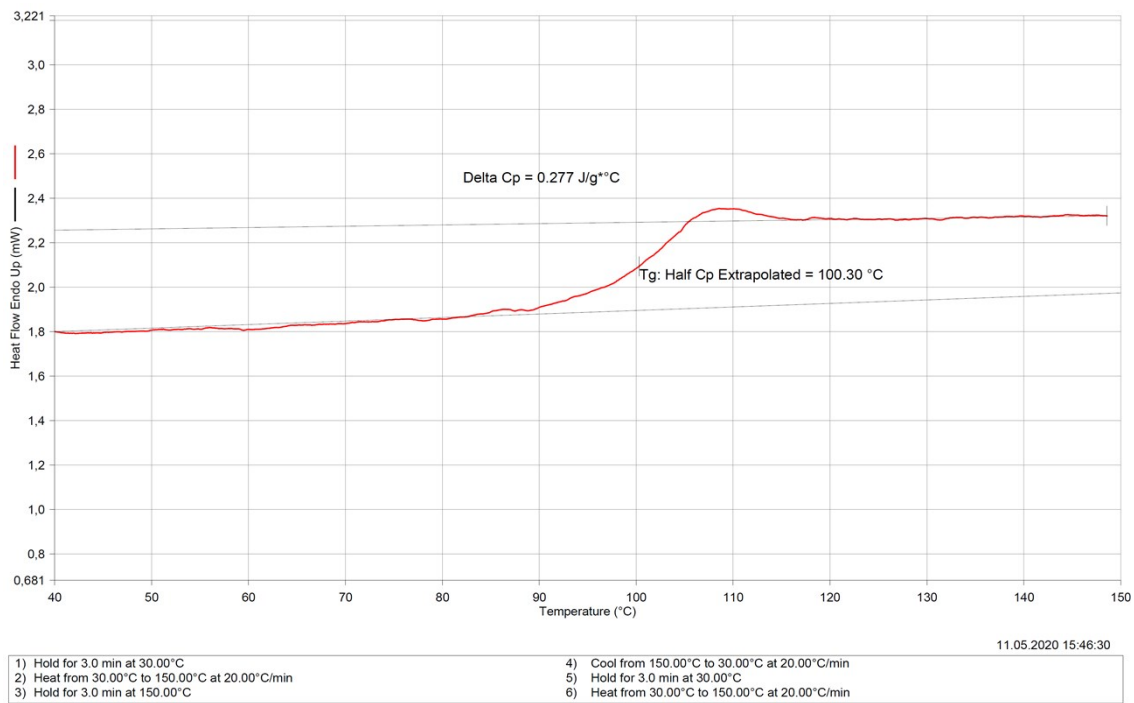


Figure S28: DSC curve of P(2-VP-stat-*m*-PyPE); 20% *m*-PyPE.

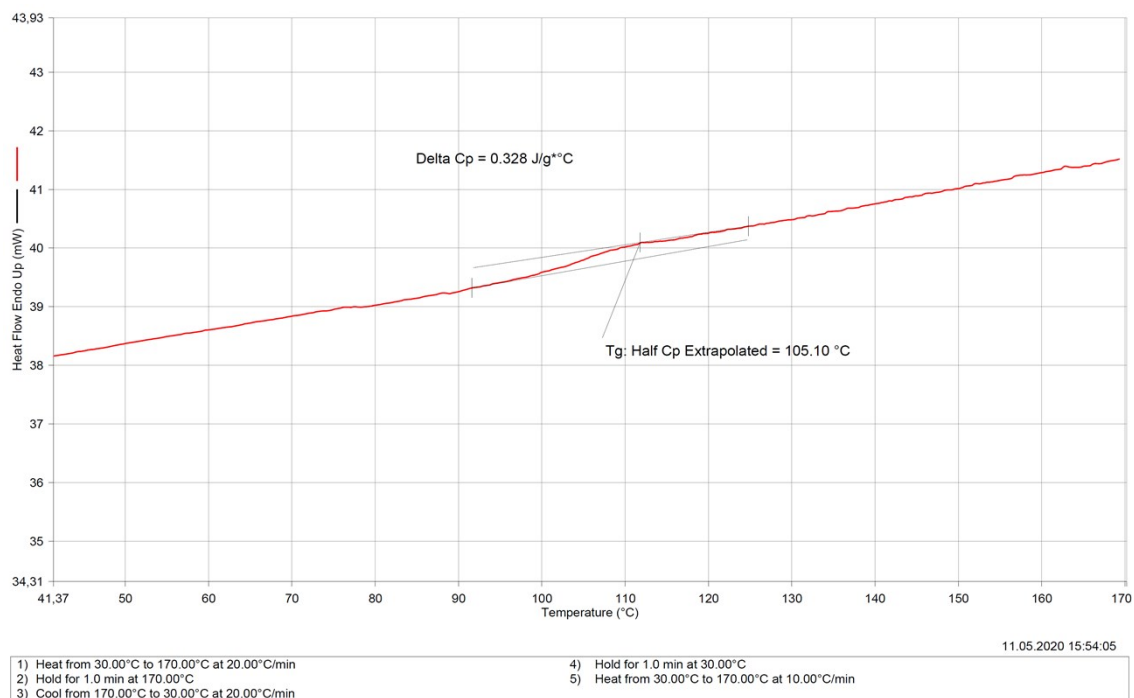


Figure S29: DSC curve of P(2-VP-stat-*m*-PyPE); 25% *m*-PyPE.

Contact angle measurements

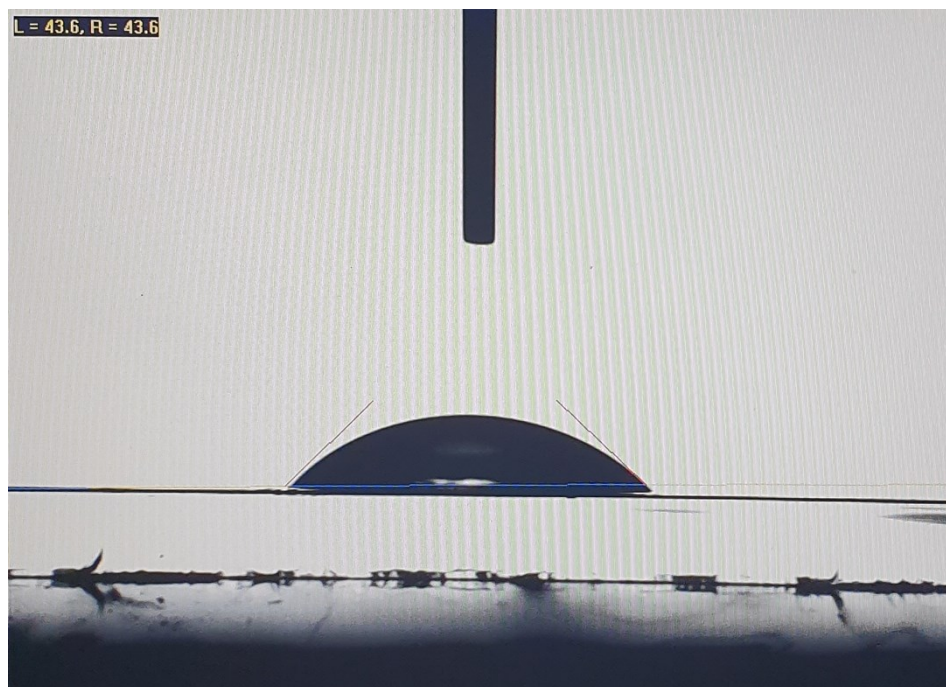


Figure S30: Exemplary contact angle of P(2-VP).

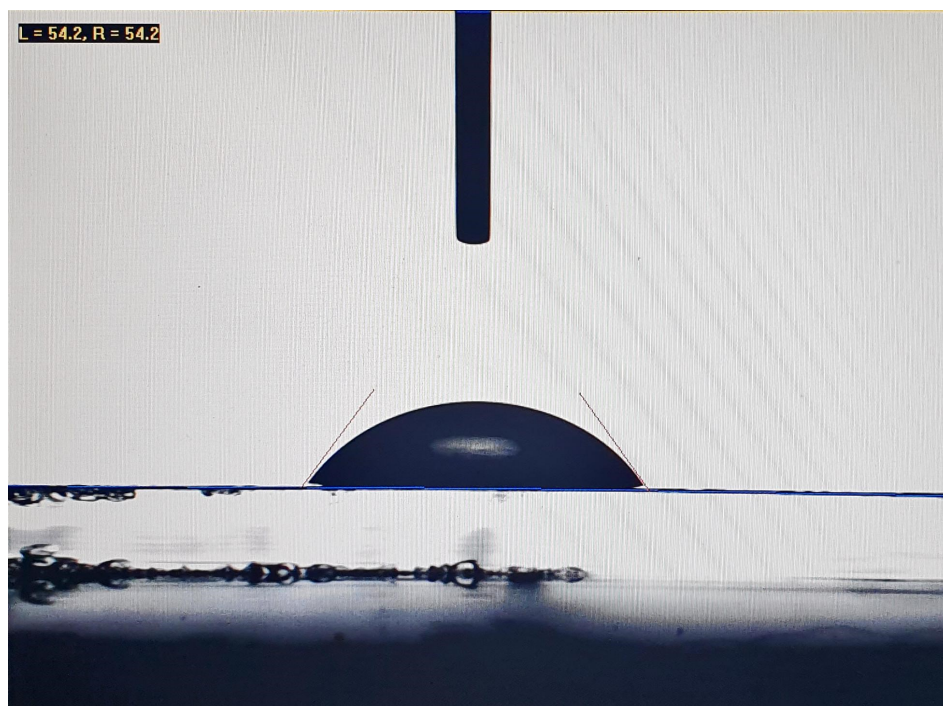


Figure S31: Exemplary contact angle of P(2-VP-stat-*m*-PyPE); 5% *m*-PyPE.

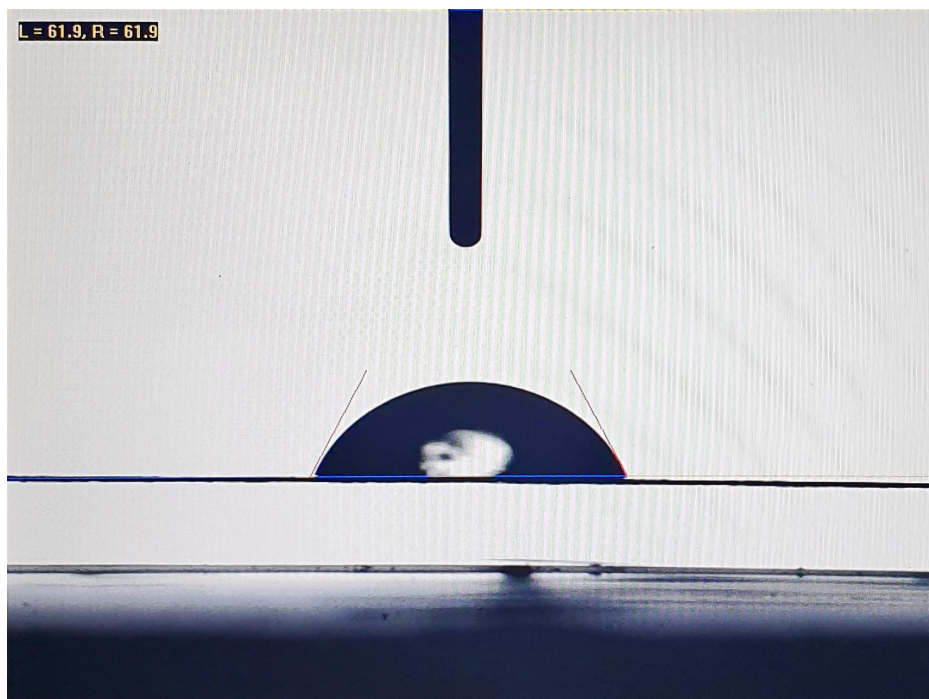


Figure S32: Exemplary contact angle of P(2-VP-stat-*m*-PyPE); 10% *m*-PyPE.

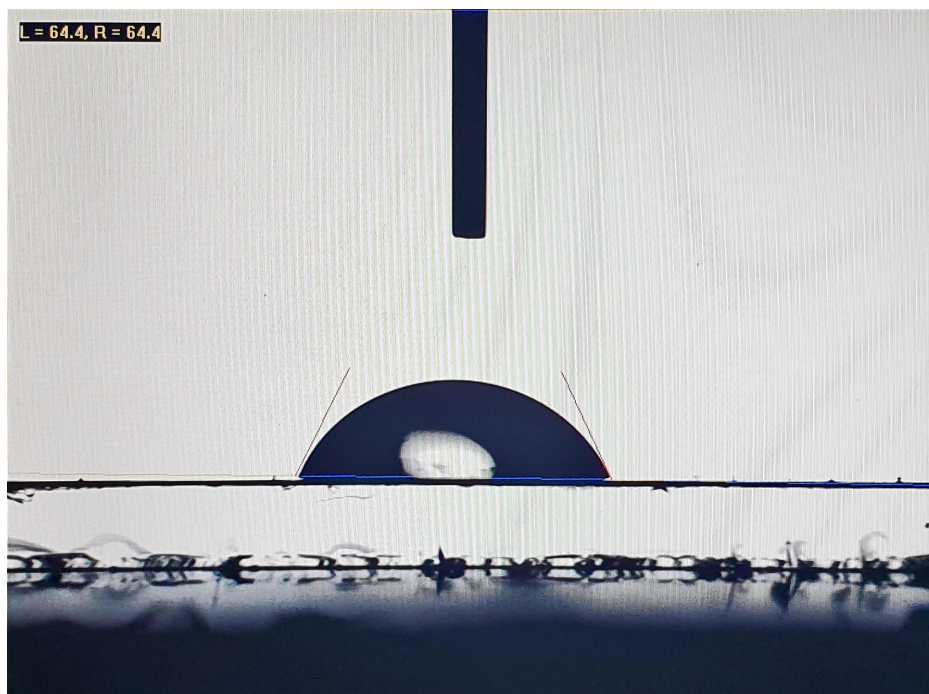


Figure S33: Exemplary contact angle of P(2-VP-stat-*m*-PyPE); 15% *m*-PyPE.

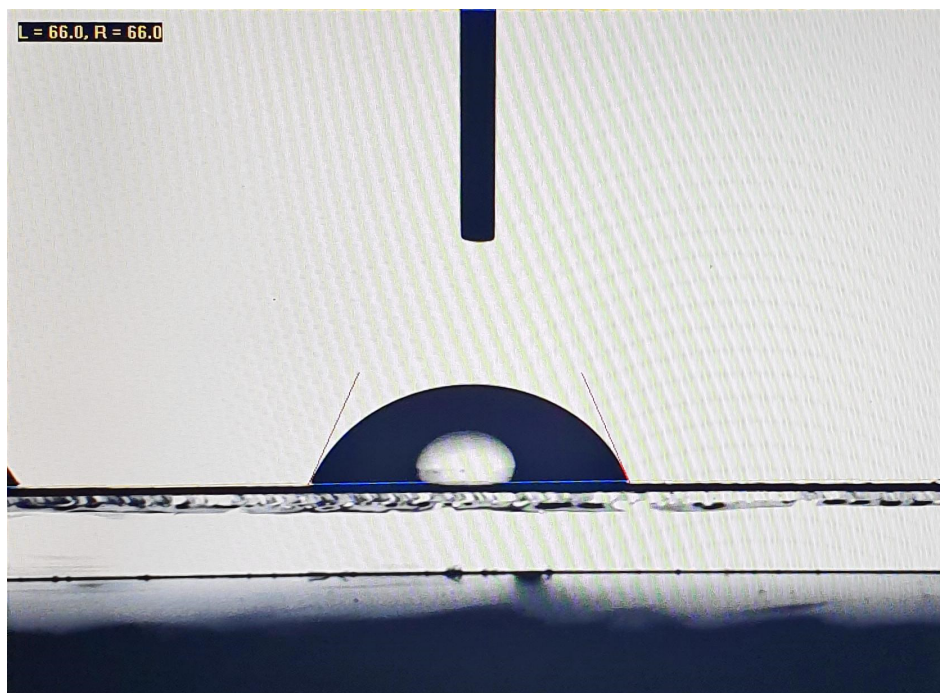


Figure S34: Exemplary contact angle of P(2-VP-stat-*m*-PyPE); 20% *m*-PyPE.

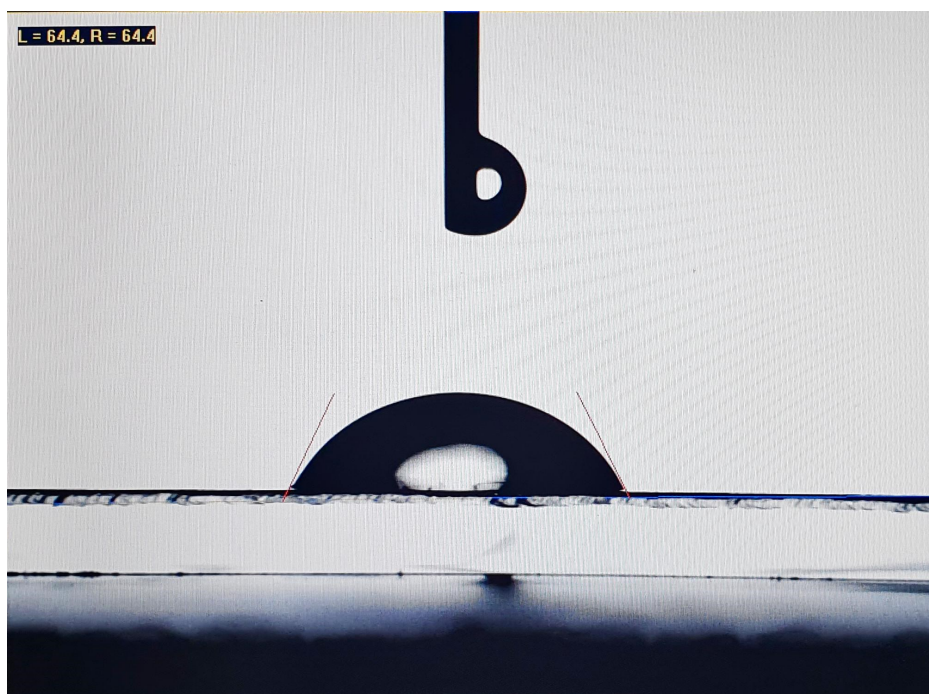


Figure S35: Exemplary contact angle of P(2-VP-stat-*m*-PyPE); 25% *m*-PyPE.

Table S1: Overview of all measured contact angles and the resulting average.

% <i>m</i> -PyPE	M1 / °	M2 / °	M3 / °	M4 / °	M5 / °	M6 / °	$\overline{CA} / °$
0	45.3	45.2	41	41.1	43.6	50.3	44.4 ± 3.1
5	57	54.4	54.2	49.6	-	-	53.8 ± 2.7
10	63.2	61.9	60	61.2	62.1	-	61.7 ± 1.1
15	60.7	66.1	64.5	63.6	64.4	-	63.9 ± 1.8
20	66.9	63.3	65.6	67.4	66	63.5	65.5 ± 1.6
25	63.5	64.3	64.8	63.2	64.4	61.8	63.7 ± 1.0