Electronic Supplementary Information (ESI).

High shear vortex fluidic morphologically controlled polysulfone formed under anhydrous conditions†

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Contents

Experimental settings

Table S 1. Experimental conditions for PSF synthesise using a nitrogen sealed VFD tube in the confined mode.

Test No	Speed, ω (rpm)	T (°C)	Tilt Angle, θ (°)	Time, t (min)
S1	3k	150	45	60
S2	4k	150	45	60
S3	5k	150	45	60
S4	**6k (optimal)**	150	45	60
S5	7k	150	45	60
S6	8k	150	45	60
S7	**6k**	120	45	60
S8	**6k**	140	45	60
S9	**6k**	150	45	60
S10	**6k**	**160 (optimal)**	45	60
S11	**6k**	170	45	60
S12	**6k**	**160**	0	60
S13	**6k**	**160**	15	60
S14	**6k**	**160**	30	60
S15	**6k**	**160**	**45 (optimal)**	60
S16	**6k**	**160**	60	60
S17	**6k**	**160**	75	60
S18	**6k**	**160**	90	60
S19	**6k**	**160**	**45**	15
S20	**6k**	**160**	**45**	30
S21	**6k**	**160**	**45**	**60 (optimal)**
S22	**6k**	**160**	**45**	180

Heating unit calibration curve

Since there is a difference between the real temperature inside the tube and the temperature which is shown on the controller of the heating unit, the heating unit was calibrated by measuring the melting point of several compounds (Table S2).

Table S 2. Reported and measured melting point of different materials using melting point measurement and heating unit controller

Standard Sample	Reported Melting Point (°C)	Melting Point Machine (°C) (T in the tube)	Melting Point on the VFD (°C) T on the controller
Vanillin	81-88	81	88
Phenacetin	134	133.5	145
DCDPS	143-146	145	159
Citric Acid	153-159	152	163
BPA	158-159	155.5	168

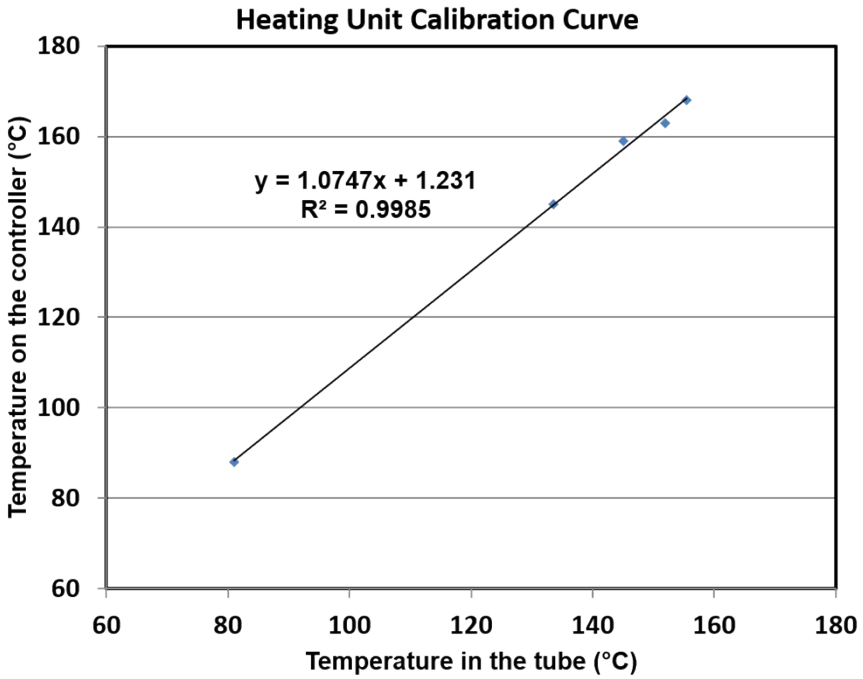

Figure S 1. Calibration curve of the heating unit.

Table S 3. Calculated experiments temperatures.

y = 1.0747x + 1.231 R^2 = 0.9985	T on the Controller (°C)	87	109	136	152	162	173	179	184	189
	T in the Tube (°C)	80	100	125	140	150	160	165	170	175

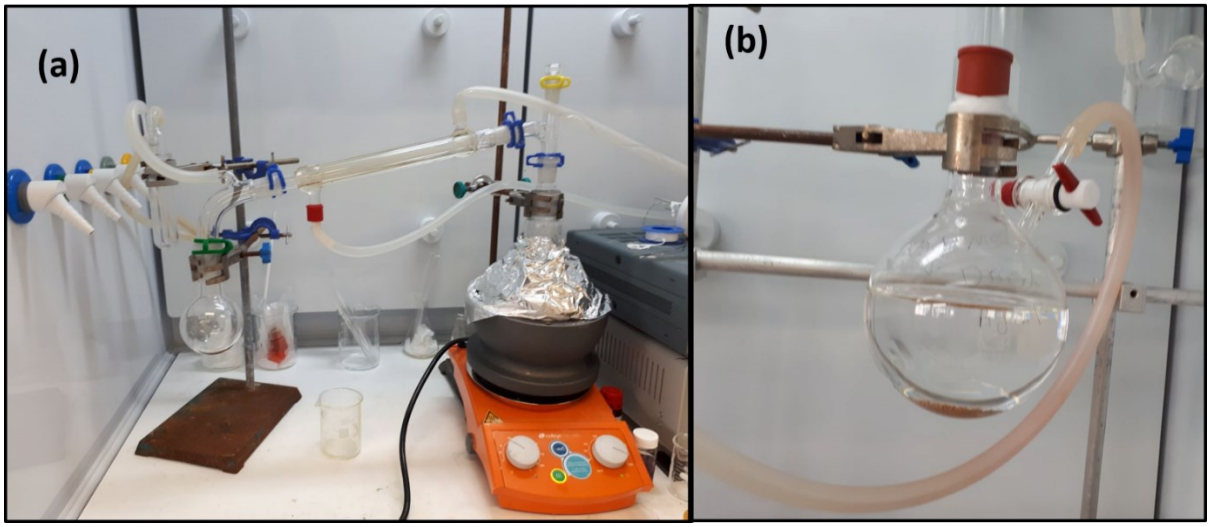

Figure S 2. (a) Experimental setup for distilling, and (b) keeping distilled DMSO under nitrogen.

NMR spectra

Bisphenol A (BPA)

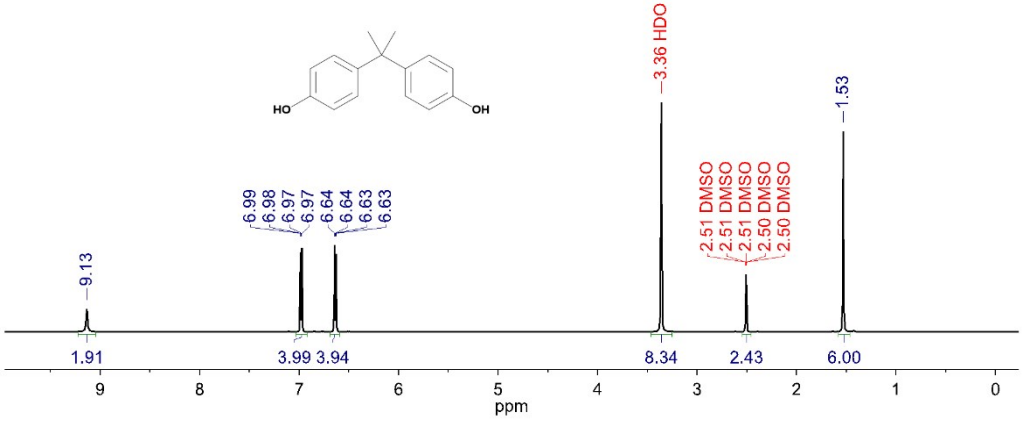

Figure S 3. [1]H-NMR of BPA as a monomer in PSF polymerization, using DMSO-d6 as the NMR solvent.(1)

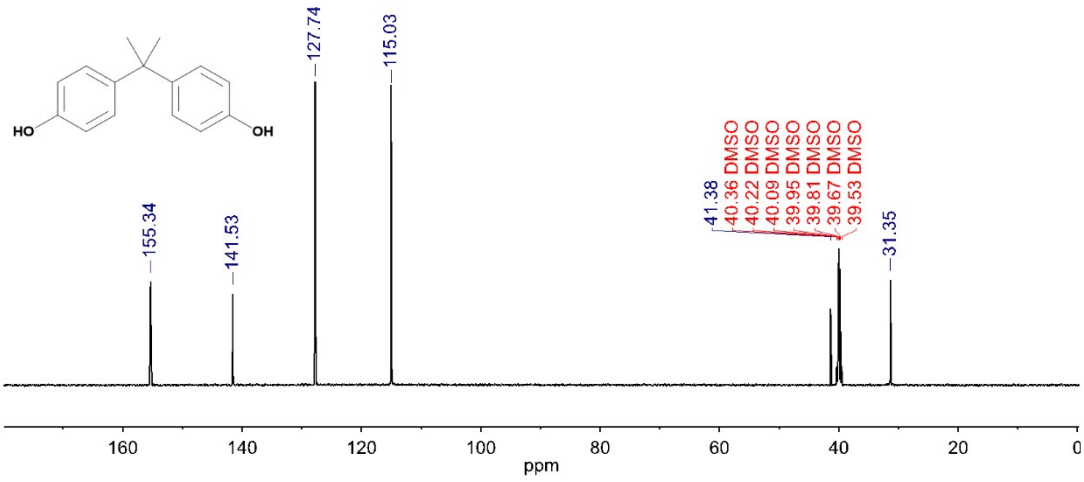

Figure S 4- [13]C NMR of BPA as a monomer PSF polymerization, using DMSO-d6 as the NMR solvent.(1)

4,4-Dichlorodiphenyl sulphone (DCDPS)

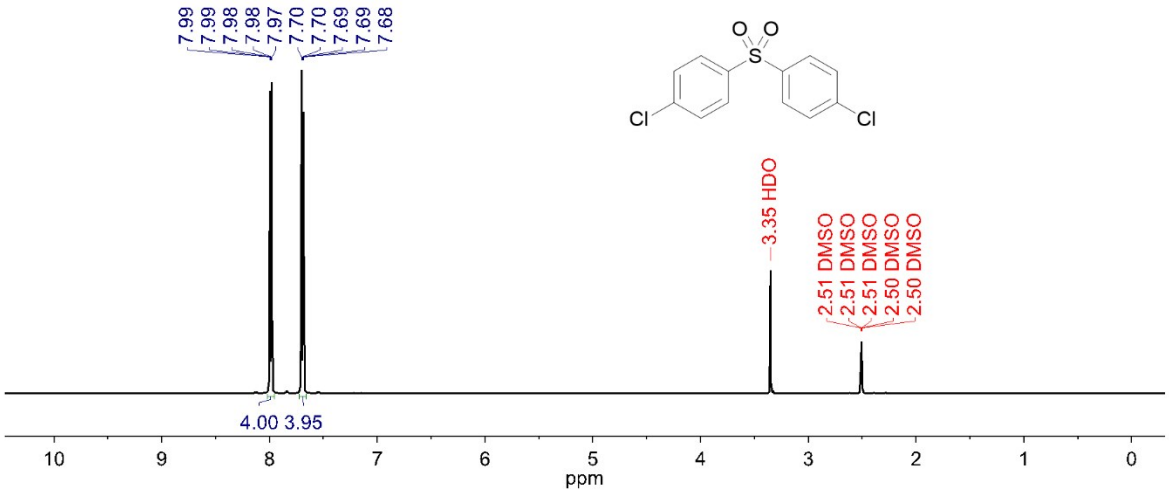

Figure S 5. [1]H-NMR of DCDPS as the second monomer in PSF polymerization, using DMSO-d6 as the NMR solvent.(1)

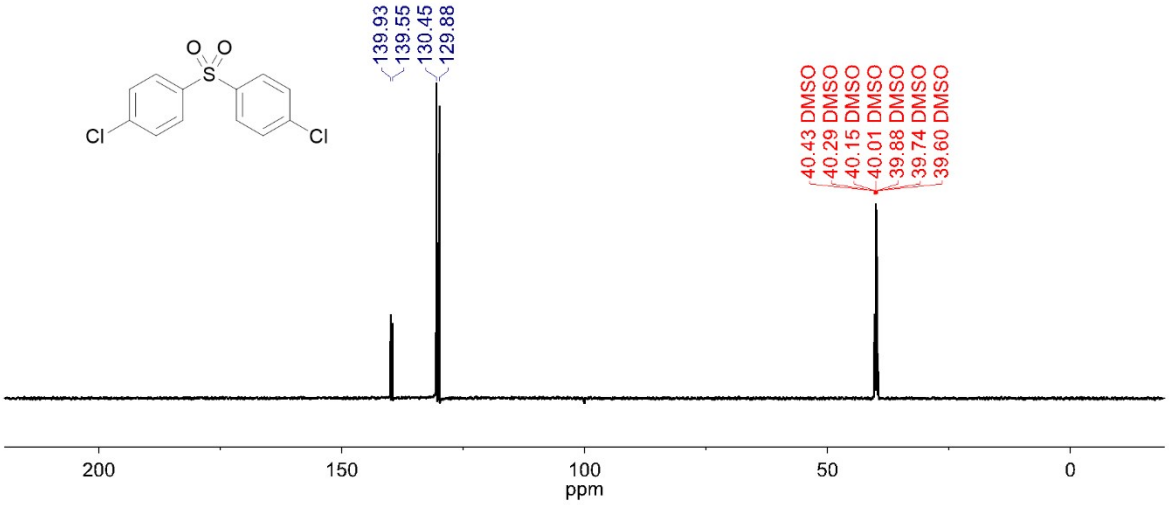

Figure S 6. [13]C-NMR of DCDPS as the second monomer in PSF polymerization, using DMSO-d6 as the NMR solvent.(1)

Polysulfone (PSF)

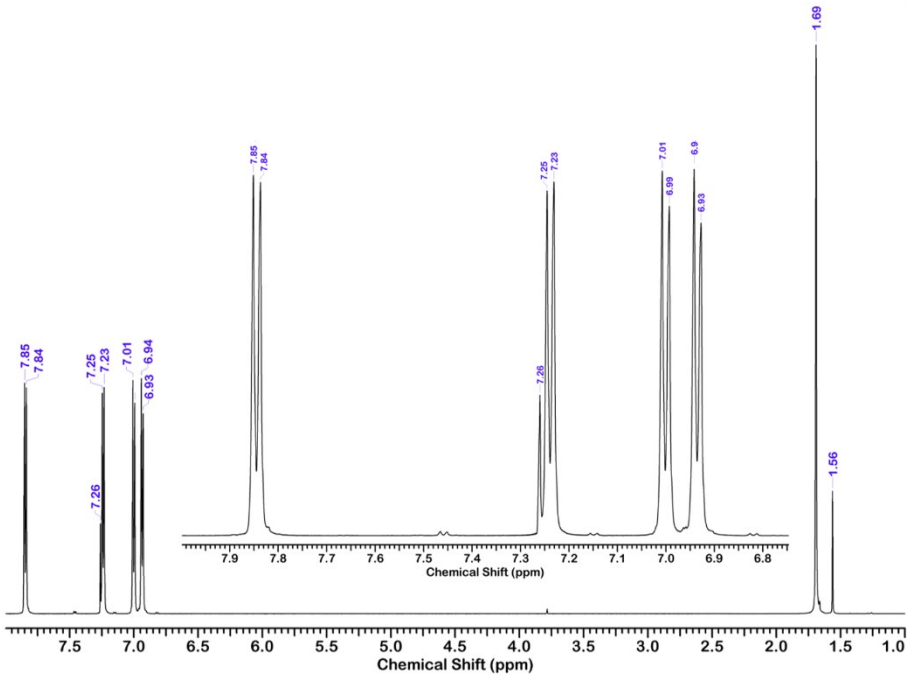

Figure S 7. ^{1}H-NMR spectra of commercial PSF, using $CDCl_3$ as the NMR solvent.

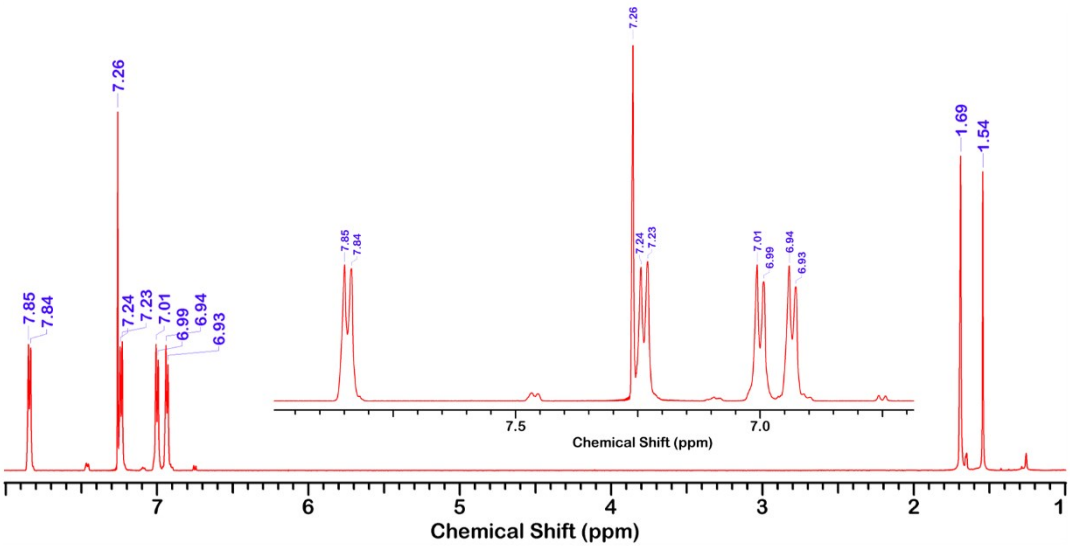

Figure S 8. ^{13}C-NMR spectra of conventional synthesised PSF, using $CDCl_3$ as the NMR solvent.

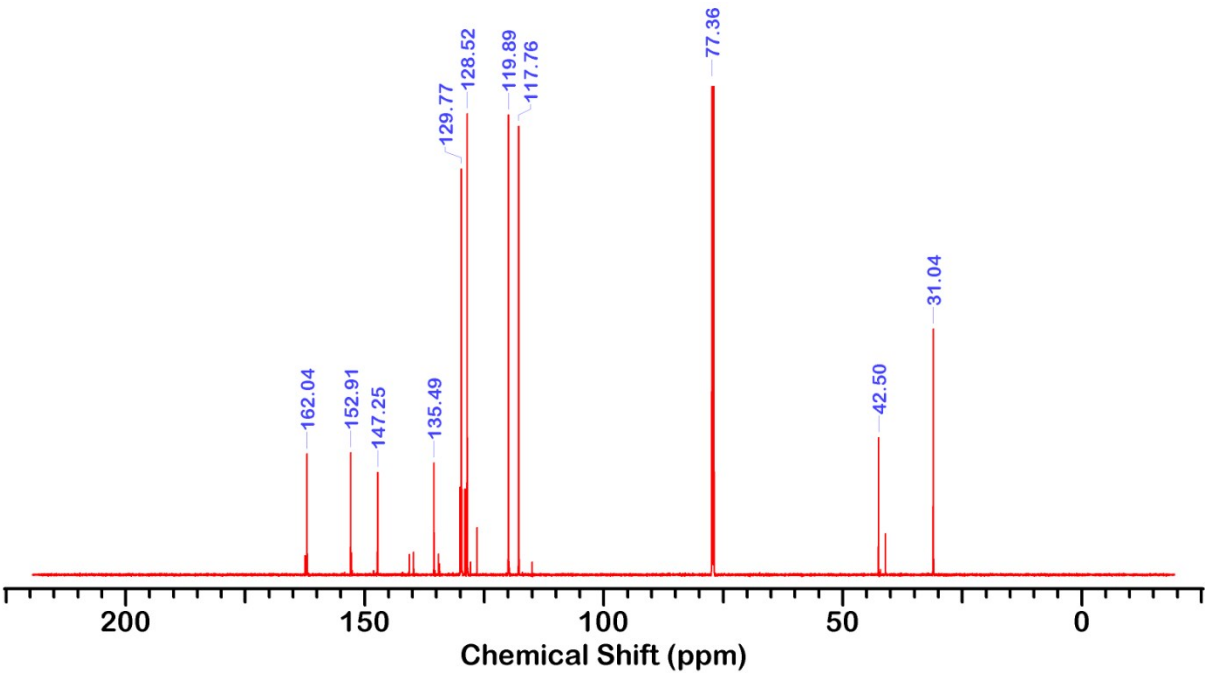

Figure S 9. ^{13}C-NMR spectra of conventional prepared PSF, using $CDCl_3$ as the NMR solvent.

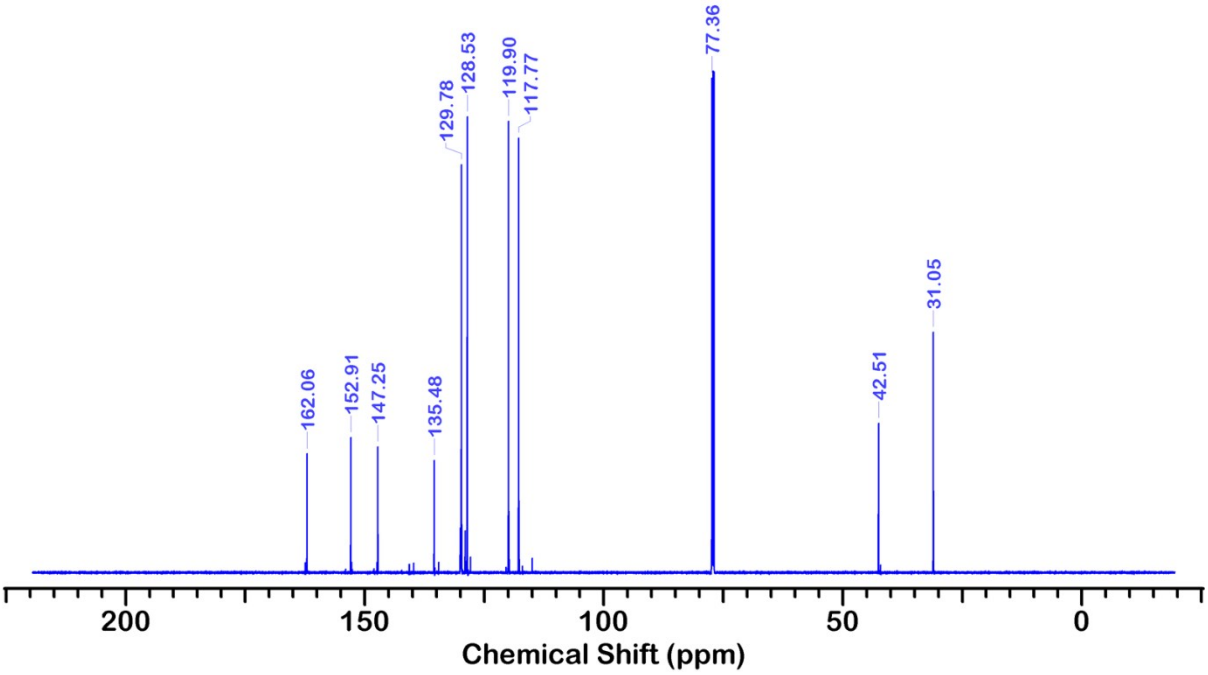

Figure S 10. ^{13}C-NMR spectra of VFD synthesised PSF at ω 6k rpm, T 160 °C, ϑ 45 tilt angle, and 60 min reaction time, using $CDCl_3$ as the NMR solvent.

References

1. Igder A, Pye S, Mohammed Al-Antaki AH, Keshavarz A, Raston CL, Nosrati A. Vortex fluidic mediated synthesis of polysulfone. RSC Advances. 2020;10(25):14761-7.