Electronic Supplementary Material (ESI) for Materials Advances.

Facile Synthesis and Self-Assembly of Pharmaceutically Important Oligobenzylidine-D-Sorbitol Dialdehydes: Direct Encapsulation and Stimuli Responsive Delivery of H_2S.

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Table S1. A review of H_2S drug delivery systems and its donors

S. No.	Delivery system	H_2S Donor	Advantages	Limitations
1	Caged thiocarbamates[1]	Thiocarbamates	Organelle targeted delivery, Resolving organelle stress	Multiple steps for H_2S delivery from donor
2	*N*-Thiocarboxyanhydrides (NTAs) and poly-NTAs[2]	Carbonyl Sulfide	Controlled release, Endothelial cell Proliferation	Multiple steps for H_2S delivery from donor
3	Mesoporous silica nanoparticles[3]	Diallyl trisulfide	Controlled release, Enhanced endothelial cell proliferation and migration, Alleviates inflammation	Toxic effects of silica nanoparticles, Multiple steps for H_2S delivery from donor
4	Hypromellose hydrogels[4]	5-(4-Hydroxyphenyl)-3*H*-1,2-dithiole-3-thione (ADT-OH)	Transdermal delivery, Enhanced mitochondrial function in HUVEC cells	Multiple steps for H_2S delivery from donor
5	Epoxide functional Polymeric nanoparticles[5]	Perthiols	Thiol triggered delivery	Multiple steps for H_2S delivery from donor
6	Microfluidics assisted large porous microspheres[6]	2-Acetyloxy benzoic acid 4-(3-thioxo-3H-1,2-dithiol-5-yl)phenyl ester (ASC-14)	Inhalable donor deposits on lungs, Treats pulmonary artery endothelial cells	Multiple steps for H_2S delivery from donor
7	Peptide Hydrogel[7]	S-aroylthiooxime	Thiol triggered controlled release, *In vitro* HUVEC proliferation and transmigration, Treat intimal hyperplasia (IH)	Multiple steps for H_2S delivery from donor
8.	Mesoporous iron oxide nanoparticles[8]	Diallyl trisulfide	Controlled release, Heart and brain targeting, Myocardial and cerebral protection from ischemic injury	Toxic effects of metal oxide nanoparticles, Multiple steps for H_2S delivery from donor
9	Gel derived from Oligobenzylidine-D-Sorbitol Dialdehyde in NMP solvent (**Present Studies**)	Direct encapsulation	1. Derived from chemicals classified as GRAS by the FDA 2. Facile synthetic strategy 3. Direct encapsulation of H_2S, without the use of any precursor 4. Stimuli responsive H_2S delivery	-

Table S2: Gelation studies with different solvents and oils

S.No	Solvent	Critical Gelation Concentration Observed(CGC wt/Vol%)			
		TBSD	HBSD	OBSD	DBSD
1	Water	P	P	P	P
2	Methanol	P	P	P	P
3	Glycerol	P	P	P	P
4	Ethylene glycol	P	P	P	P
5	Tetrahydrofuran	P	P	P	P
6	Dimethyl sulfoxide	G(1.2)	G(0.8)	G(1)	G(1)
7	Dimethyl sulfoxide + water	G(1)	G(0.6)	G(1)	G(1)
8	Acetone	P	P	P	P
9	1,4-dioxane	P	P	P	P

10	Dimethyl formamide	G(1)	G(1)	G(1)	G(1)
11	Poly(ethylene glycol)	P	P	P	P
12	Acetic acid	P	P	P	P
13	N-methyl pyrrolidone	G(1.5)	G(1.0)	G(1.5)	G(1.5)
14	1,2-Dichlorobenzene	P	P	P	P
15	pyridine	P	P	P	P
16	Ethanol	P	P	P	P
17	n-Butanol	P	P	P	P
18	Toluene	P	P	P	P
19	Diesel	P	P	P	P
20	Hazel nut oil	P	P	P	P
21	Olive oil	P	P	P	P
22	Linseed oil	P	P	P	P
24	Dimethyl carbonate	P	P	P	P
25	Cyrene	P	P	P	P

P – Precipitation; G – Gelation; S - solution

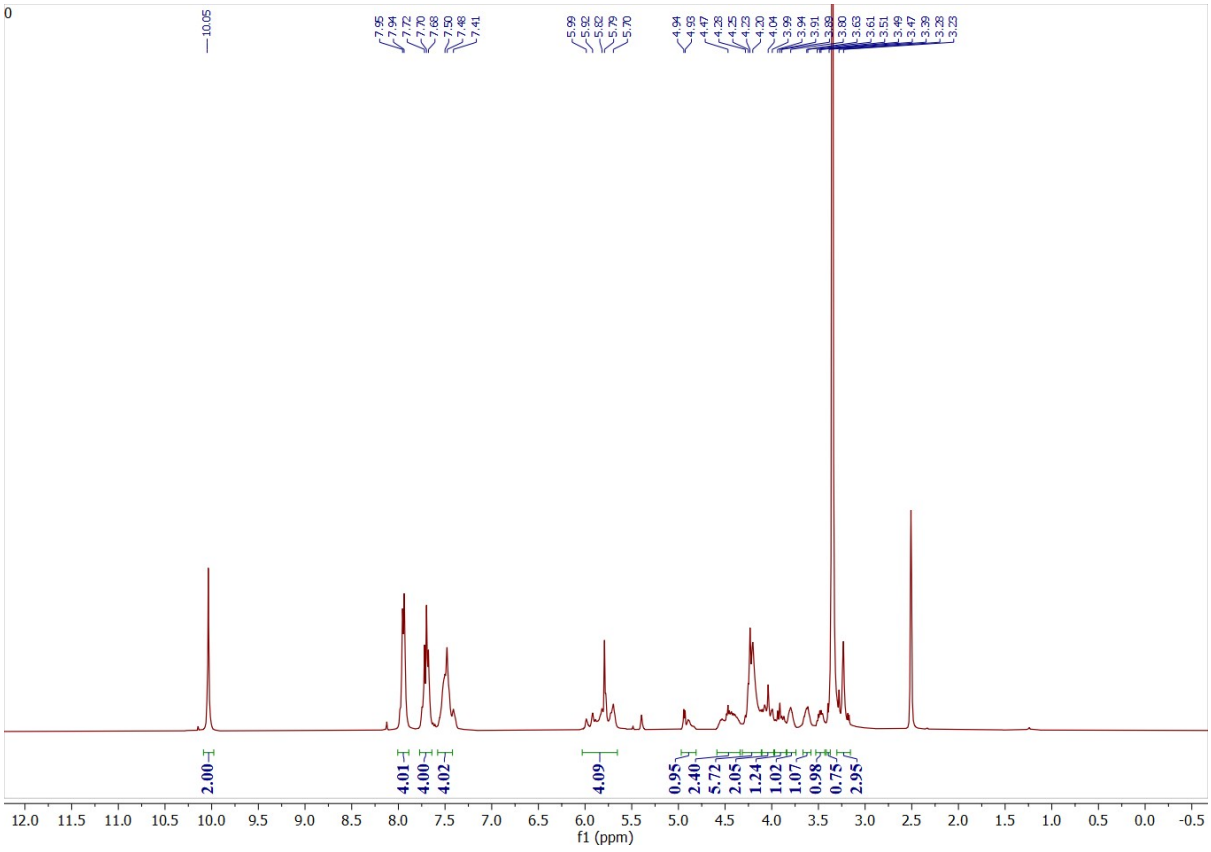

Figure S1: ^{1}H NMR of compound 3 in DMSO-d_6.

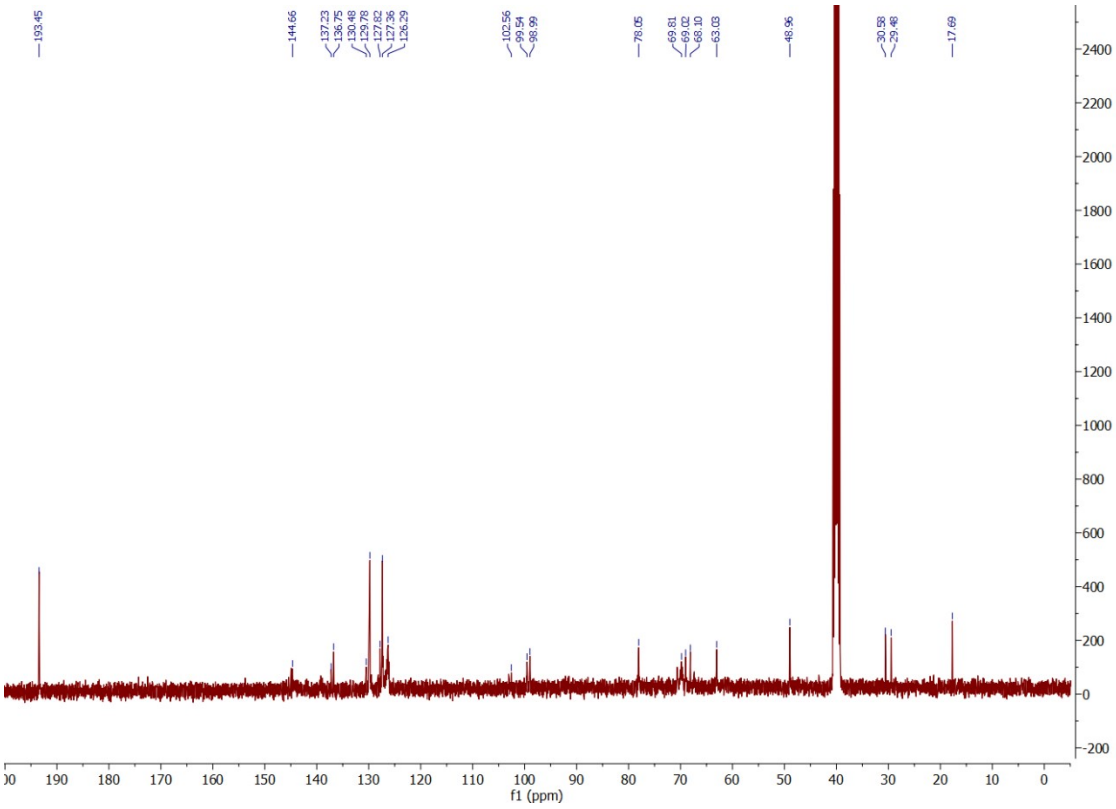

Figure S2: ^{13}C NMR of compound 3 in DMSO-d_6.

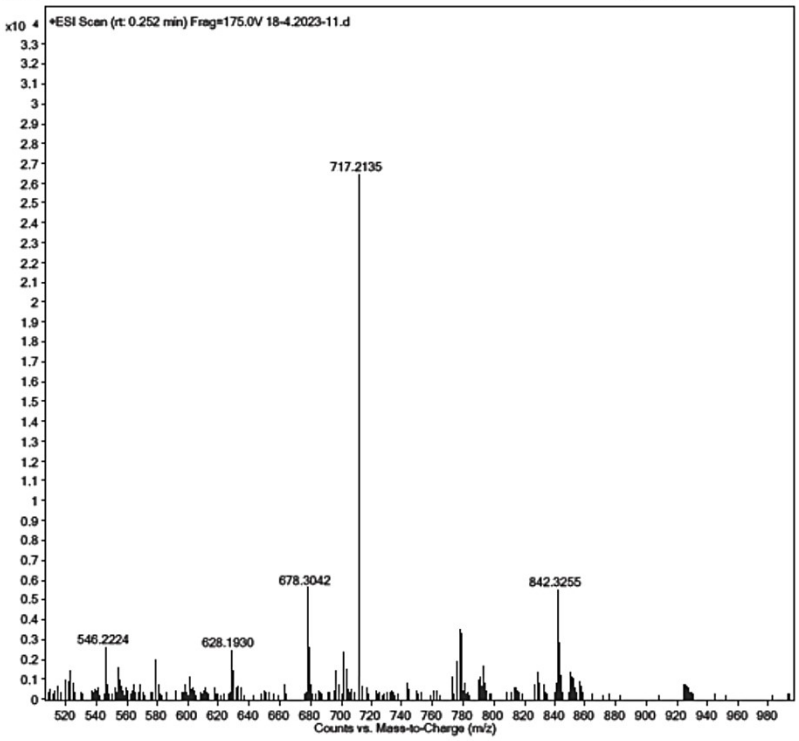

Figure S3: HRMS Spectra of Compound 3.

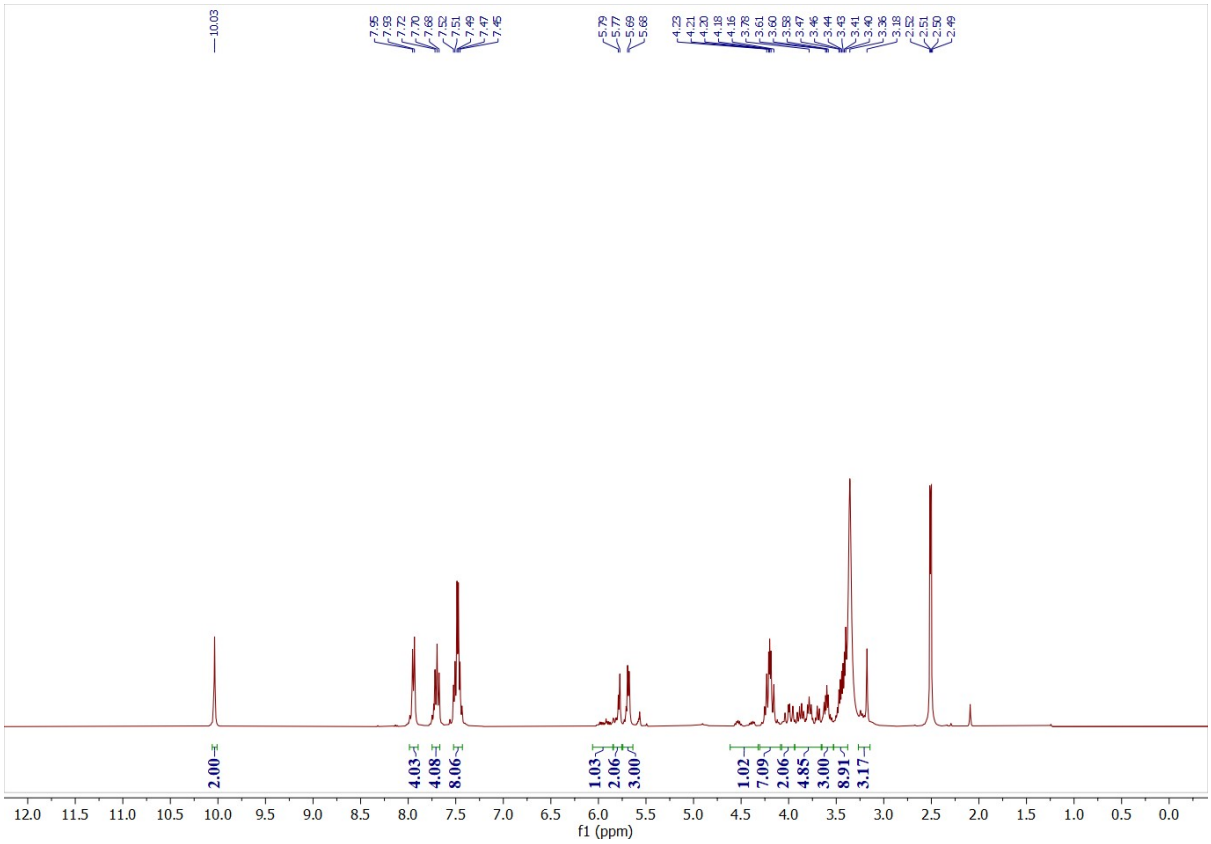

Figure S4: ^{1}H NMR of compound 4 in DMSO-d_6.

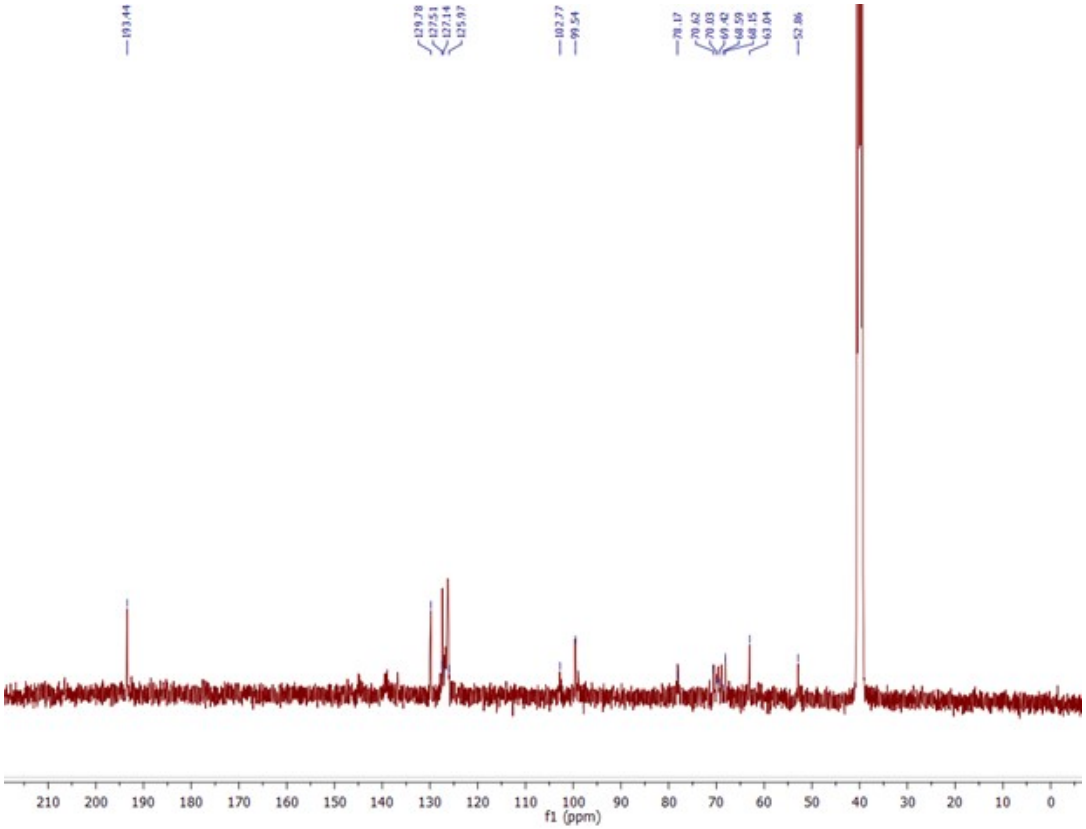

Figure S5: ^{13}C NMR of compound 4 in DMSO-d_6

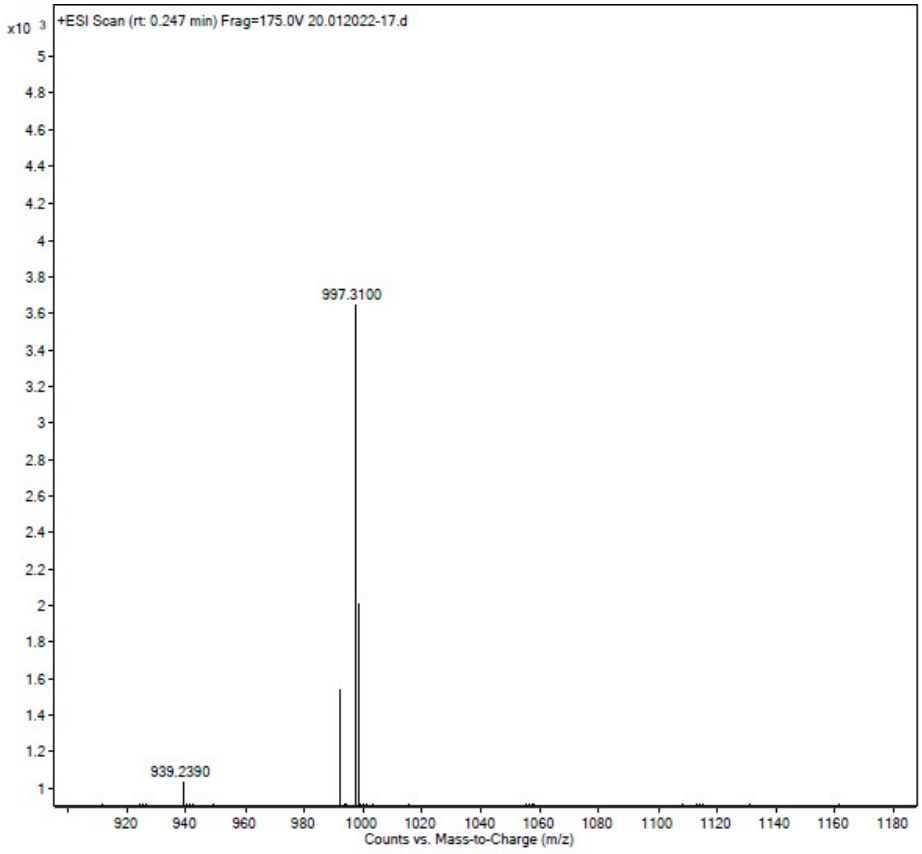

Figure S6: HRMS Spectra of Compound 4.

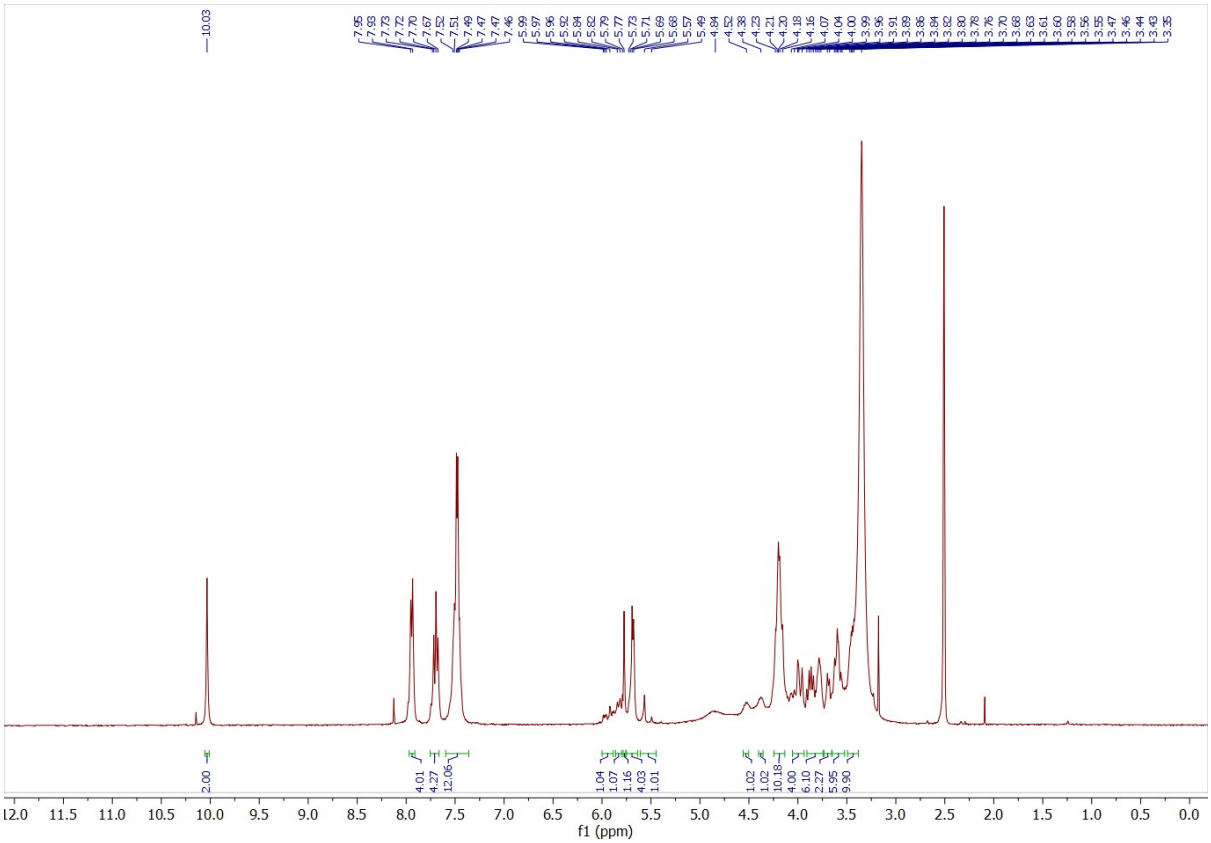

Figure S7: ^{1}H NMR of compound 5 in DMSO-d_6.

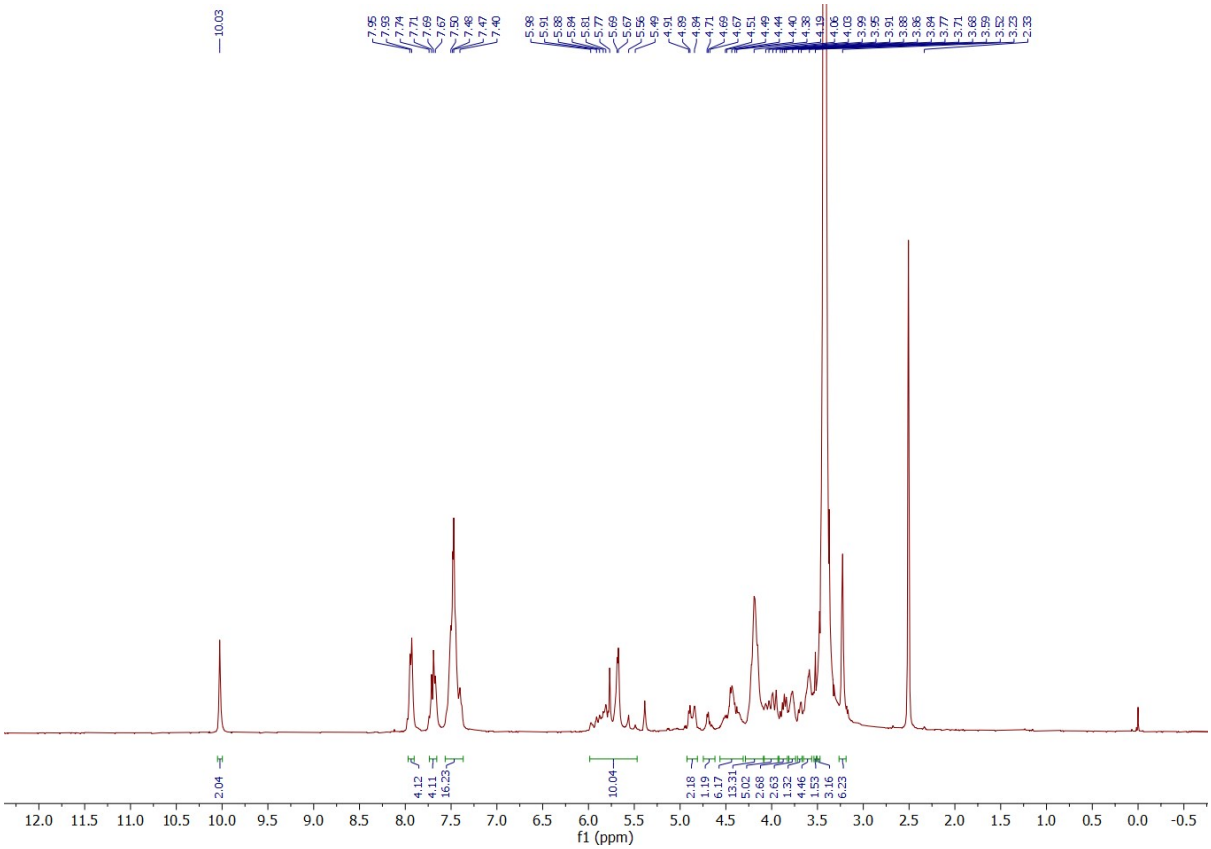

Figure S8: ^{1}H NMR of compound 6 in DMSO-d_6.

Calculation of the number of units in OBSDA oligomer

The number of units present in the OBSDA oligomer is obtained from integration of number of aromatic protons, acetal protons and protons attached to the sorbitol backbone. In a single unit of OBSDA, there are 8 aromatic protons, 2 acetal protons and 10 sorbitol protons. When one more unit is attached, the aromatic protons are increased by 4 protons, acetal protons are increased by 2 protons and the sorbitol protons are increased by 10 protons relatively.

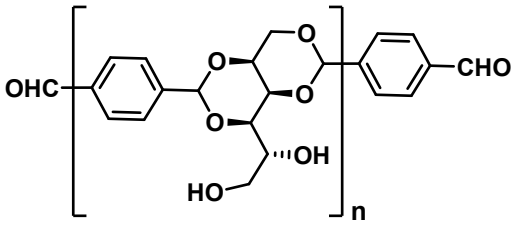

Table S3: Number of units in OBSDA oligomer

Aromatic protons	Acetal protons	Sorbitol protons	No of units(n)
12H	4H	20H	2 (Fig S1)
16H	6H	30H	3 (Fig S4)
20H	8H	40H	4 (Fig S7)
24H	10H	50H	5 (Fig S8)

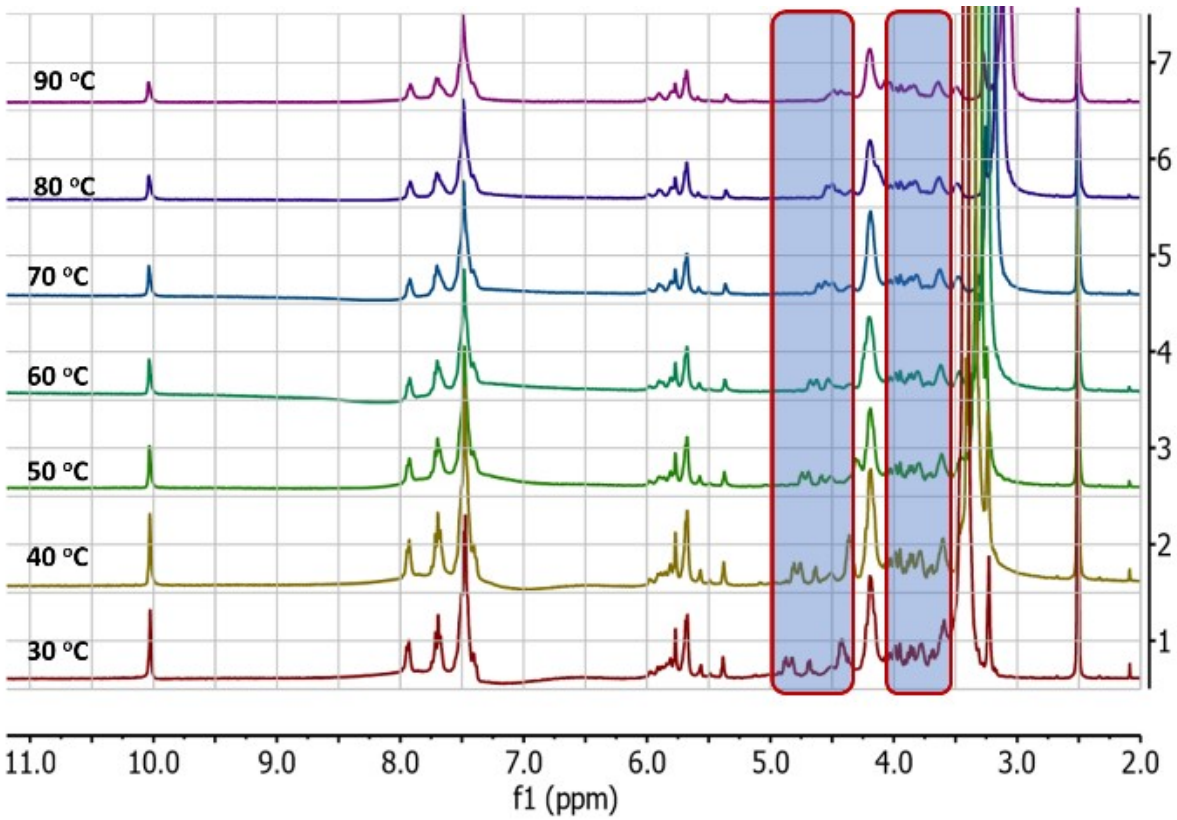

Figure S9. Variable temperature ^{1}H-NMR spectra of gel formed by HBSD in DMSO-d_6

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