Supporting Information

Amyloid Peptide Mixtures: Self-Assembly, Hydrogelation, Nematic Ordering and Catalysts in Aldol Reactions

Juliane N. B. D. Pelin,[a,b] Barbara B. Gerbelli,[a] Charlotte J. C. Edwards-Gayle,[b] Andrea M. Aguilar,[c] Valeria Castelletto, [b] Ian W. Hamley,[b] Wendel A. Alves[a],*

[a]*Centro de Ciências Naturais e Humanas, Universidade Federal do ABC, 09210-580, Santo André, Brazil.*

[b] *Department of Chemistry, University of Reading, Reading RG6 6AD, United Kingdom.*

[c]*Instituto de Ciências Ambientais, Químicas e Farmacêuticas, Universidade Federal de São Paulo, Diadema, 09972-270, Brazil.*

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Number of tables: 2

* Authors for correspondence: wendel.alves@ufabc.edu.br, I.W.Hamley@reading.ac.uk

Table S1. FTIR peak positions obtained using 0.5 wt% of of P[RF]$_4$:[RF]$_4$ mixtures 0:1 (**1**), 3:7 (**2**); 5:5 (**3**), 7:3 (**4**), and 1:0 (**5**), at native pH.

Sample	**Vibration (cm^{-1})**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
(**1**)	1672	1641	1607	1585	1457	1435	1368
(**2**)	1673	1643	1609	1585	1457	1438	1365
(**3**)	1673	1638	1607	1585	1450	1433	1368
(**4**)	1673	1646	1610	1585	1455	1438	1366
(**5**)	1672	1639	1609	1586	1459	1438	-

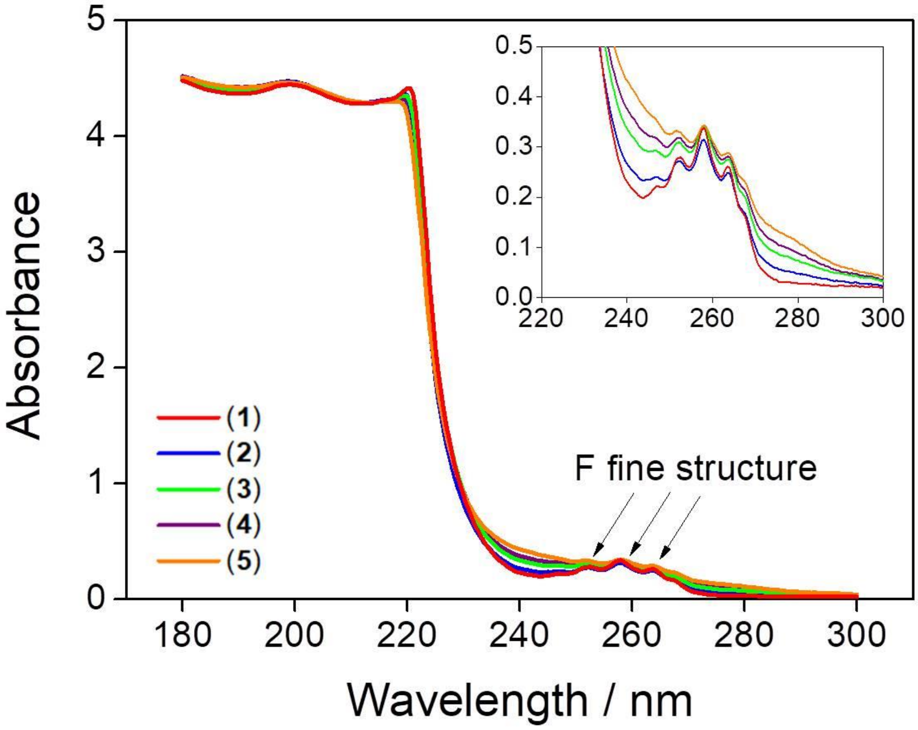


Figure S1. Absorption spectra of of P[RF]$_4$:[RF]$_4$ mixtures 0:1 (**1**), 3:7 (**2**); 5:5 (**3**), 7:3 (**4**), and 1:0 (**5**), , above the *cac* in water. Insert: amplified bands of the phenylalanine peaks.

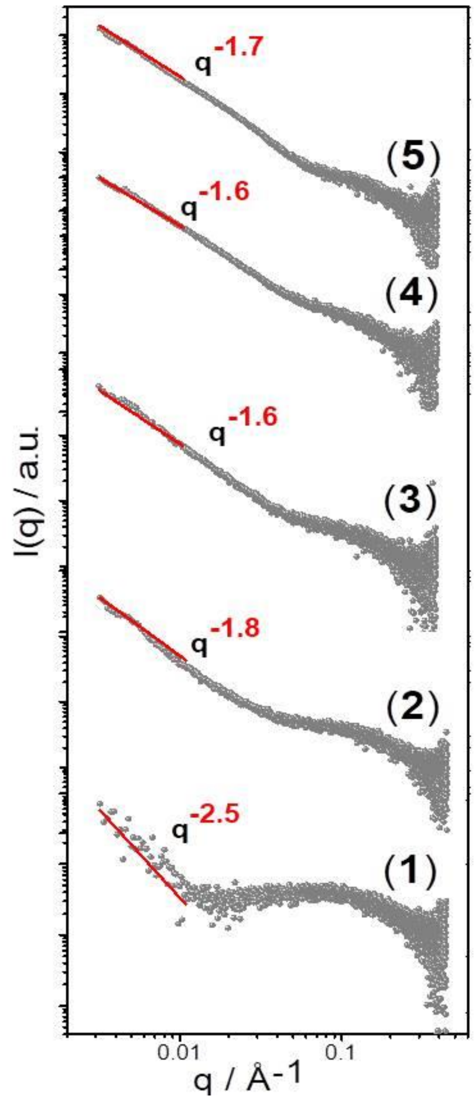
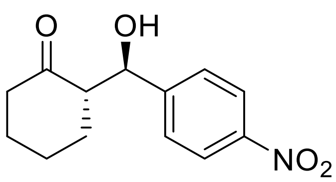
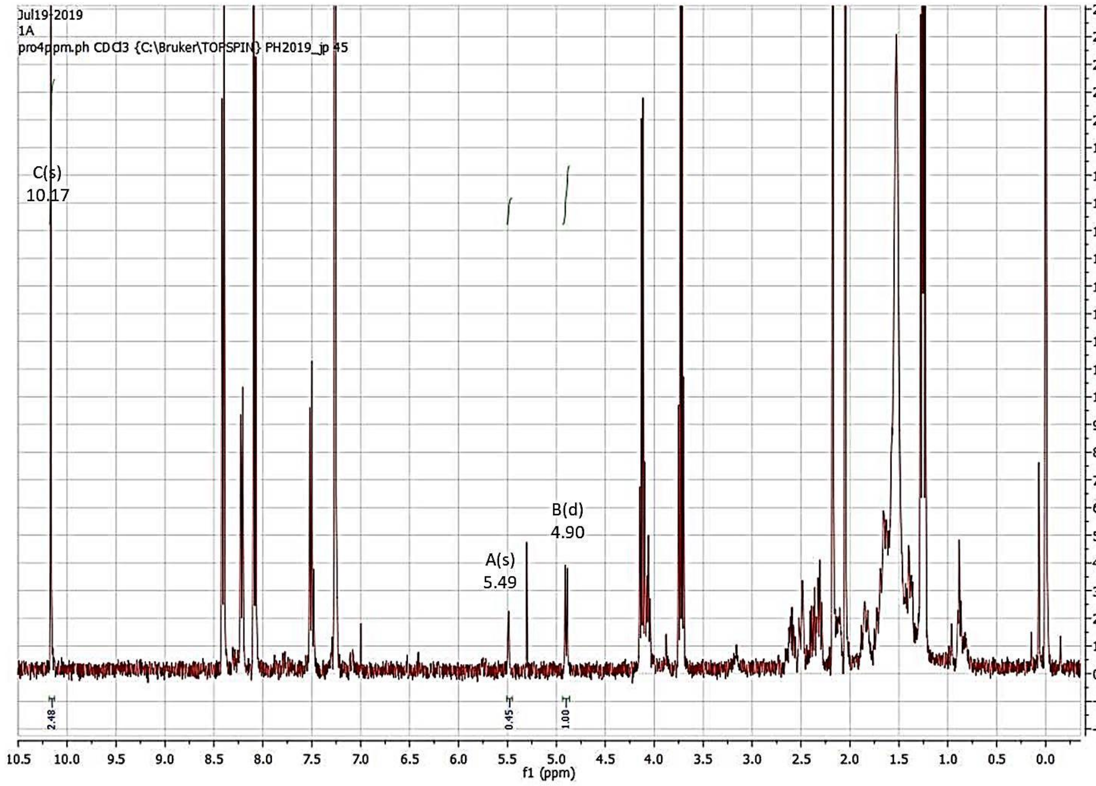


Figure S2. SAXS data showing linear fit in the Guinier regime for 0.5 wt% of of P[RF]$_4$:[RF]$_4$ mixtures 0:1 (**1**), 3:7 (**2**); 5:5 (**3**), 7:3 (**4**), and 1:0 (**5**).

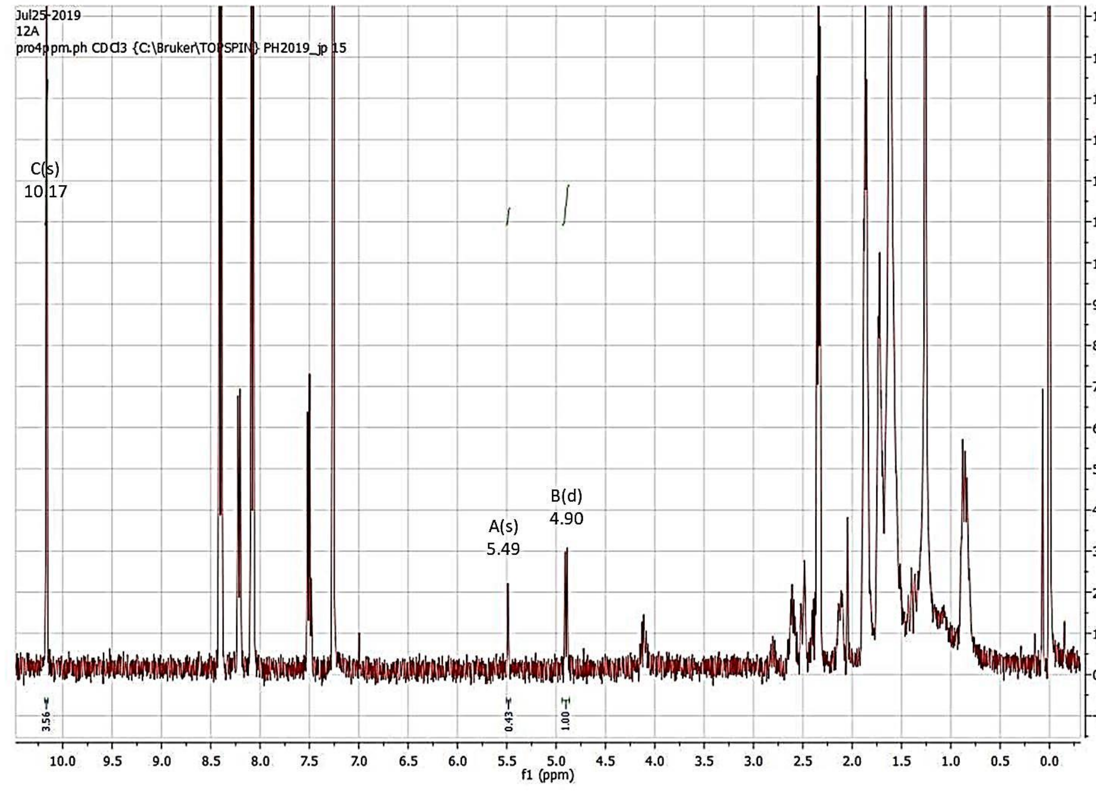
(*S*)-2-((*R*)-Hydroxy(4-nitrophenyl)methyl)cyclohexan-1-one



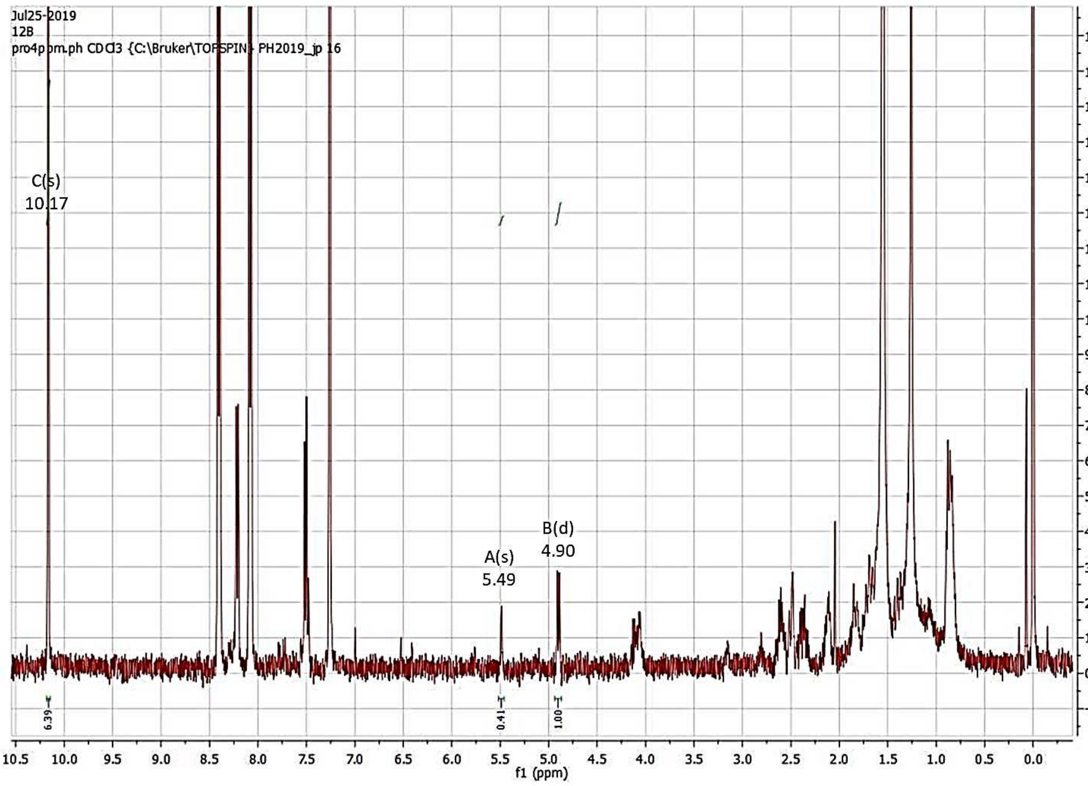
(**1**) 5 mol%


Jul19-2019
1A
pro4ppm.ph CDCl3 {C:\Bruker\TOPSPIN} PH2019_jp 45
C(s)
10.17
A(s)
5.49
B(d)
4.90
2.48
0.45
1.00
f1 (ppm)

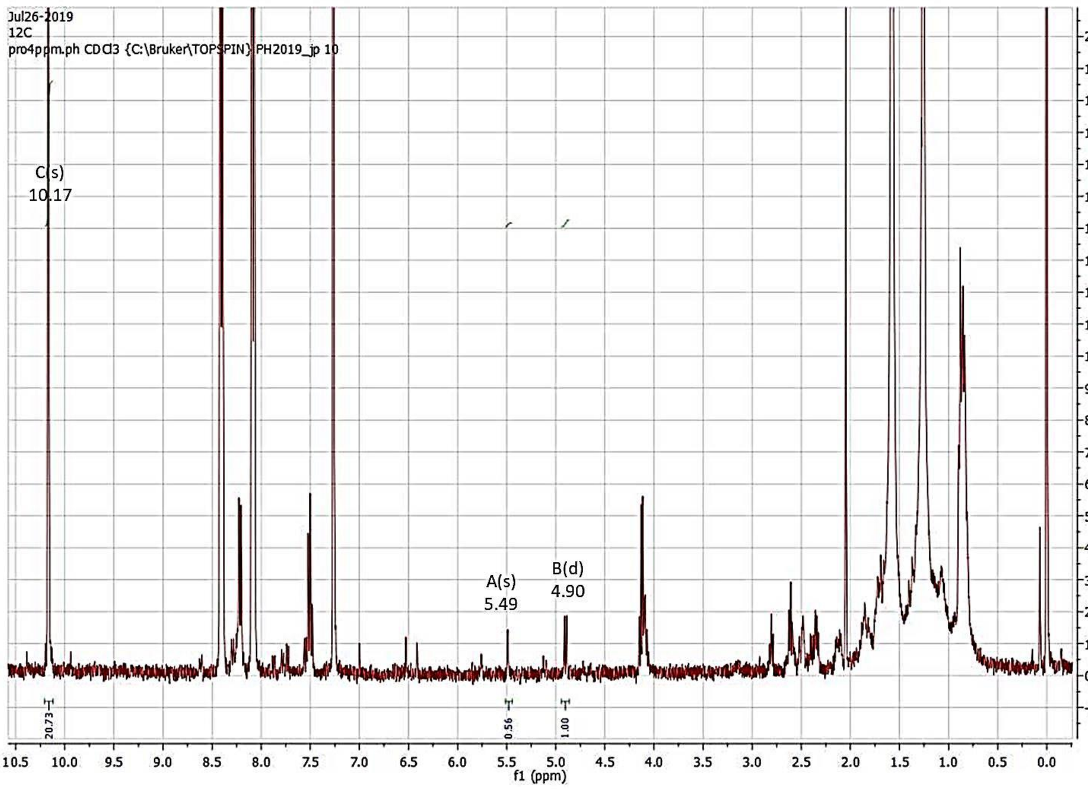
(**2**) 5 mol%


Jul25-2019
12A
pro4ppm.ph CDCl3 {C:\Bruker\TOPSPIN} PH2019_jp 15
C(s)
10.17
A(s)
5.49
B(d)
4.90
3.56
0.43
1.00
f1 (ppm)

(**3**) 5 mol%


Jul25-2019
12B
pro4ppm.ph CDCl3 {C:\Bruker\TOPSPIN} PH2019_jp 16
C(s)
10.17
A(s)
5.49
B(d)
4.90
6.39
0.41
1.00
f1 (ppm)

(**4**) 5 mol%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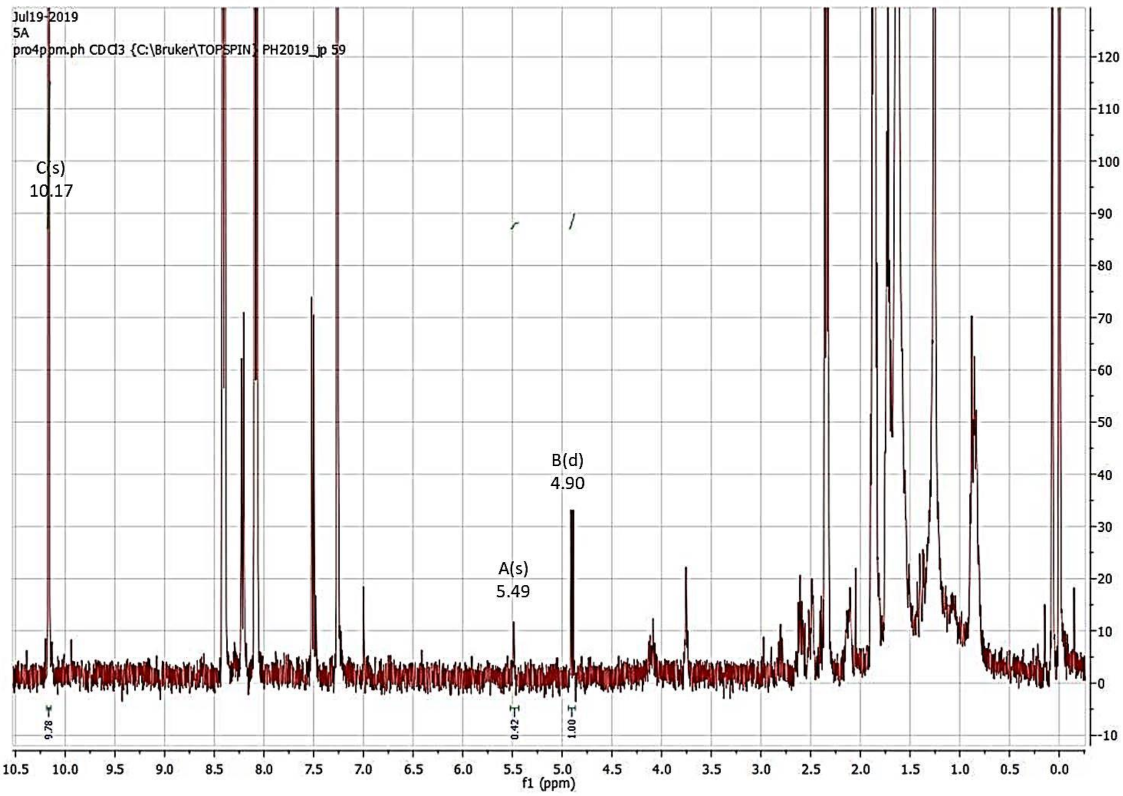
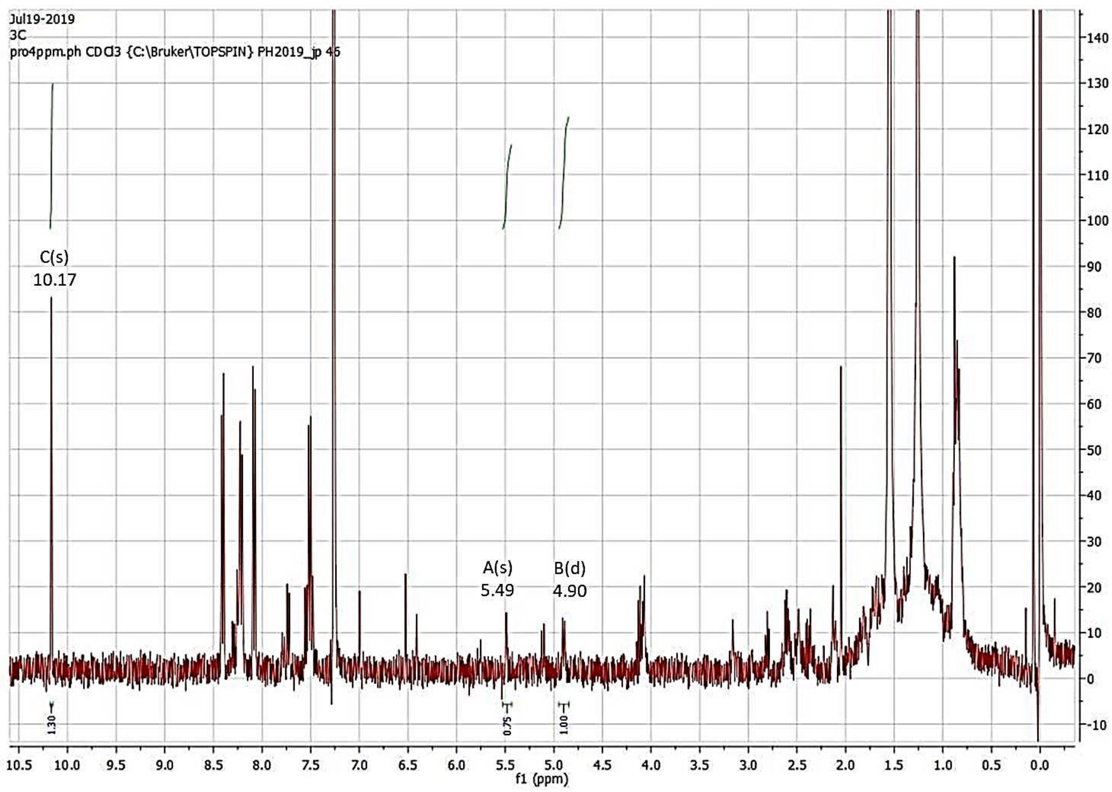
12C
pro4ppm.ph CDCl3 {C:\Bruker\TOPSPIN} PH2019_jp 10
C(s)
10.17
A(s)
5.49
B(d)
4.90
20.73
0.56
1.00
f1 (ppm)

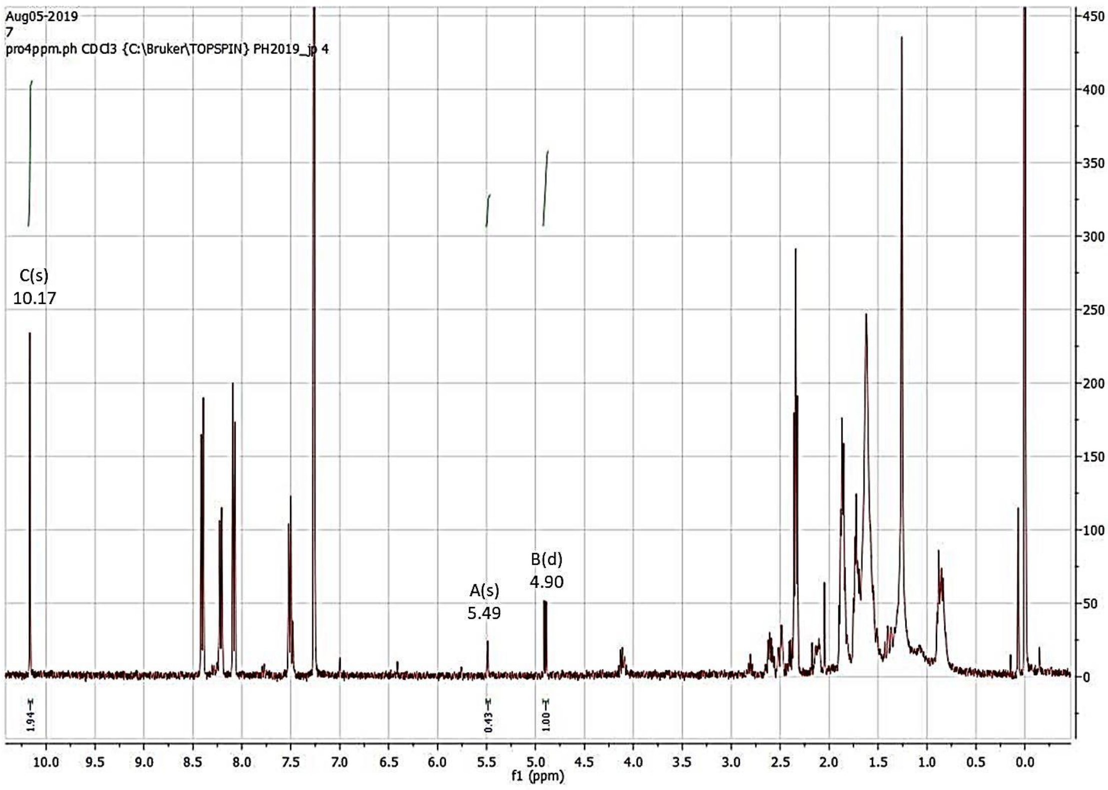
(**5**) 5 mol%



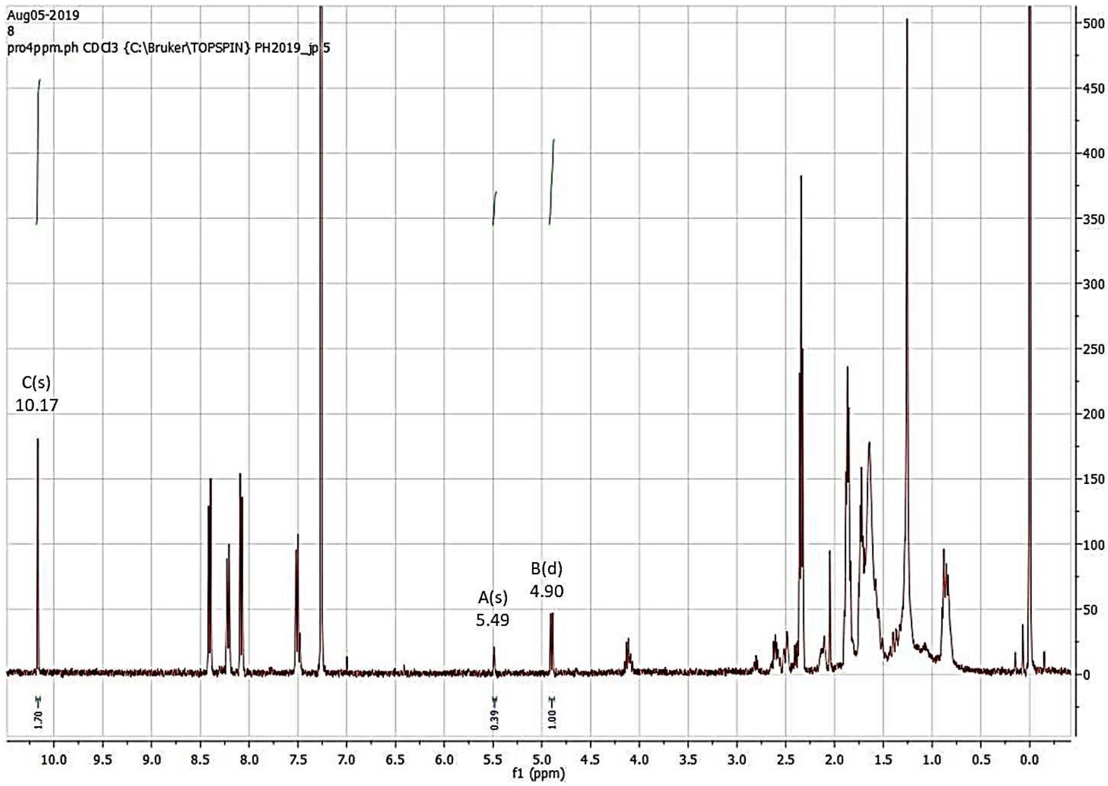
(**1**) 20 mol%



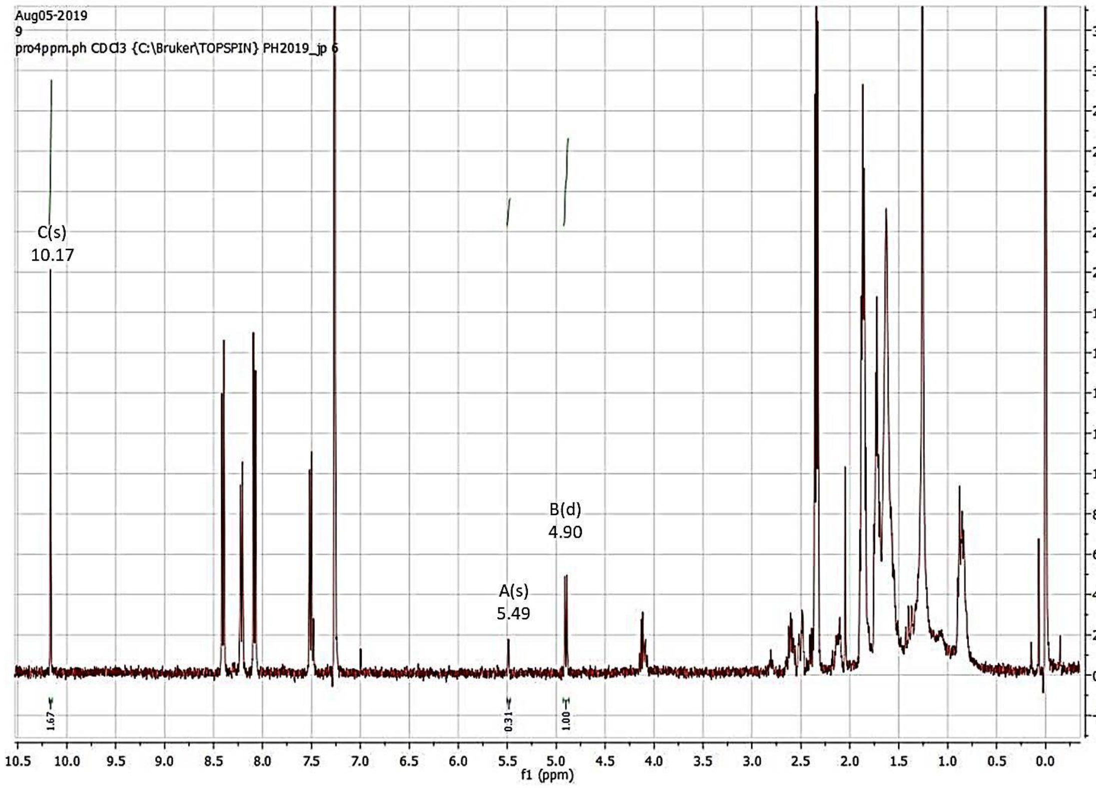
(**2**) 20 mol%



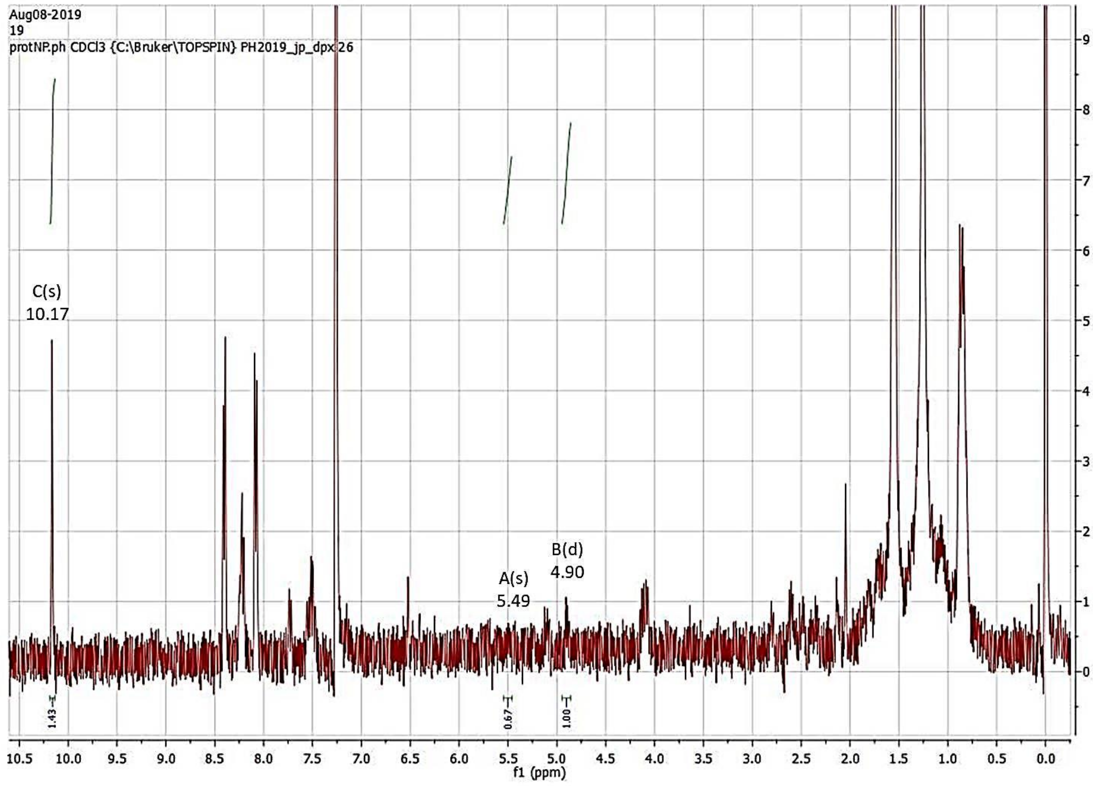
(**3**) 20 mol%



(**4**) 20 mol%



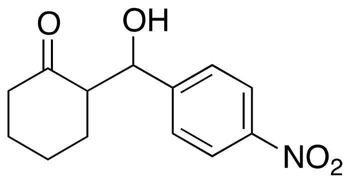
(**5**) 20 mol%



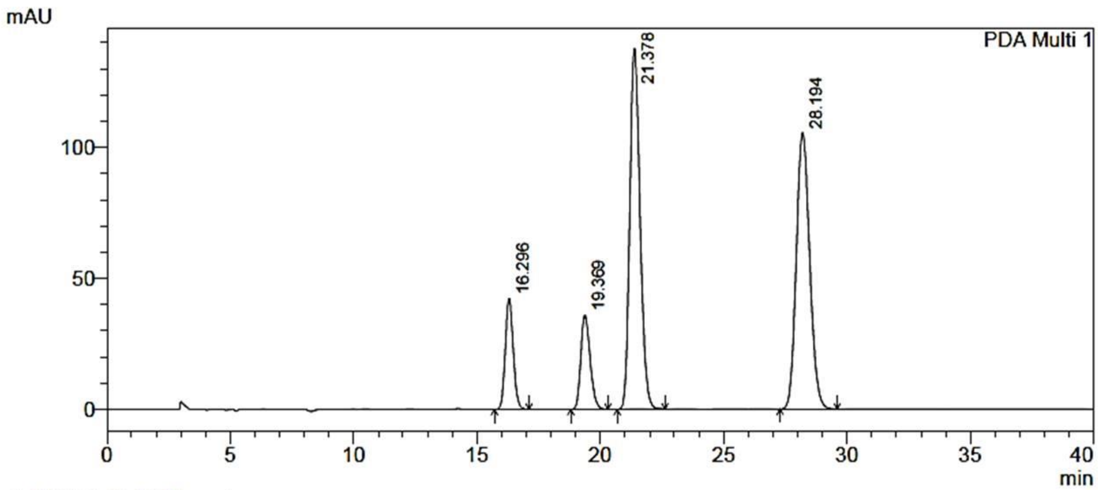
^{1}H NMR (300 MHz, $CDCl_3$): δ 8.22-8.18 (m, 2H, ArH), 7.51-7.47 (m, 2H, ArH), 5.49 (br s, 1H, C*H*OH of *syn* diastereoisomer), 4.90 (dd, J = 7.5 Hz, 3.0 Hz, 1H, CHOH of *anti* diastereoisomer), 2.66-2.30 (m, 1H, C*H*CHOH), 2.66-2.30 (m, 2H, $CH_2C(O)$), 2.16-1.24 (m, 6H, chex-H).

Figure S3. Representative ^{1}H NMR spectra of crude aldol products of of $P[RF]_4$:$[RF]_4$ mixtures 0:1 (**1**), 3:7 (**2**); 5:5 (**3**), 7:3 (**4**), and 1:0 (**5**), considering 5 mol% and 20 mol% of catalyst, described in Table 3.

Chiral-phase HPLC analysis



racemic



PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.296	943300	42301	9.594	13.158
2	19.369	939071	35915	9.551	11.171
3	21.378	3974790	137730	40.428	42.841
4	28.194	3974557	105542	40.426	32.829
Total		9831718	321489	100.000	100.000

3D Graph

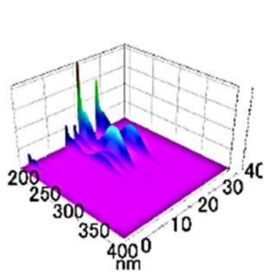


Figure S4. HPLC chromatogram for racemic aldol product. Conditions: Chiralpak AD-H, hexane/2-propanol (90/10); 1.0 mL·min^{-1}, λ= 254 nm.

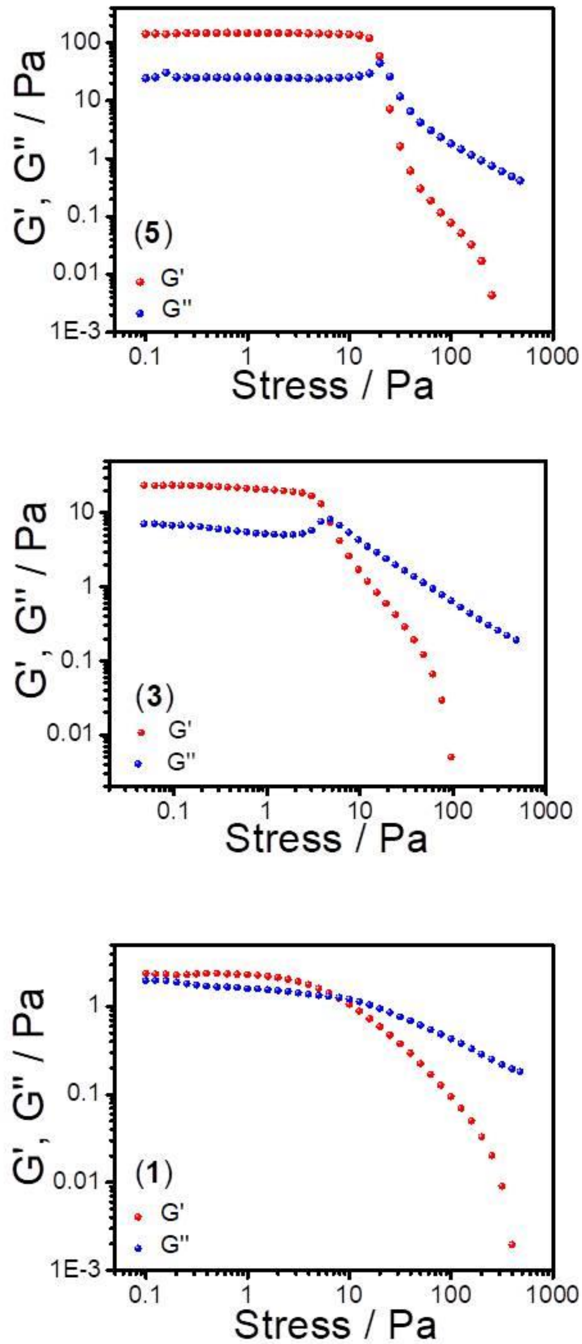


Figure S5. Storage and shear moduli obtained by rheology experiments in stress sweep mode of mixtures (**1**), (**3**), and (**5**).

Table S2. Fit parameters from SAXS for 3 wt% hydrogels of mixtures (**1**), (**3**), and (**5**).

Hydrogel	**Long Cylindrical Shell**				
	R (nm)	**σ_R (nm)**	**ΔR (nm)**	**η_{core}**	**η_{shell}**
(**1**)	2.5	0.18	0.68	1.6×10^{-7}	9.1×10^{-9}
(**3**)	2.3	0.45	0.50	2.1×10^{-7}	1.1×10^{-7}
(**5**)	0.7	0.07	0.61	-7.4×10^{-7}	3.5×10^{-6}