Supporting Information for

Effect of complementary small molecules in the properties of bicomponent hydrogel of riboflavin

Abhijit Saha, Bappaditya Roy, Aluri Esterrani and Arun K. Nandi*

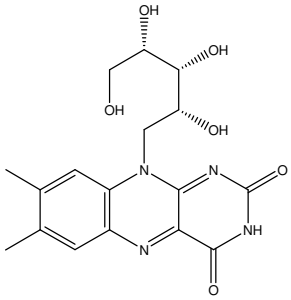
Polymer Science Unit, Indian Association for the Cultivation of Science,

Jadavpur,

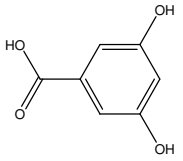
Kolkata-700 032, India

* for correspondence, email: psuakn@iacs.res.in

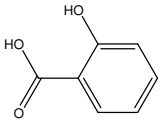
Supporting Scheme SS1: Chemical structures of riboflavin, acetoguanamine, salicylic acid and 3,5- dihydroxy benzoic acid.



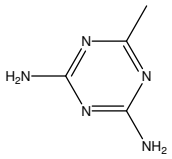
Riboflavin (**R**)



3,5-dihydroxy benzoic acid (**B**)



Salicylic acid (**S**)

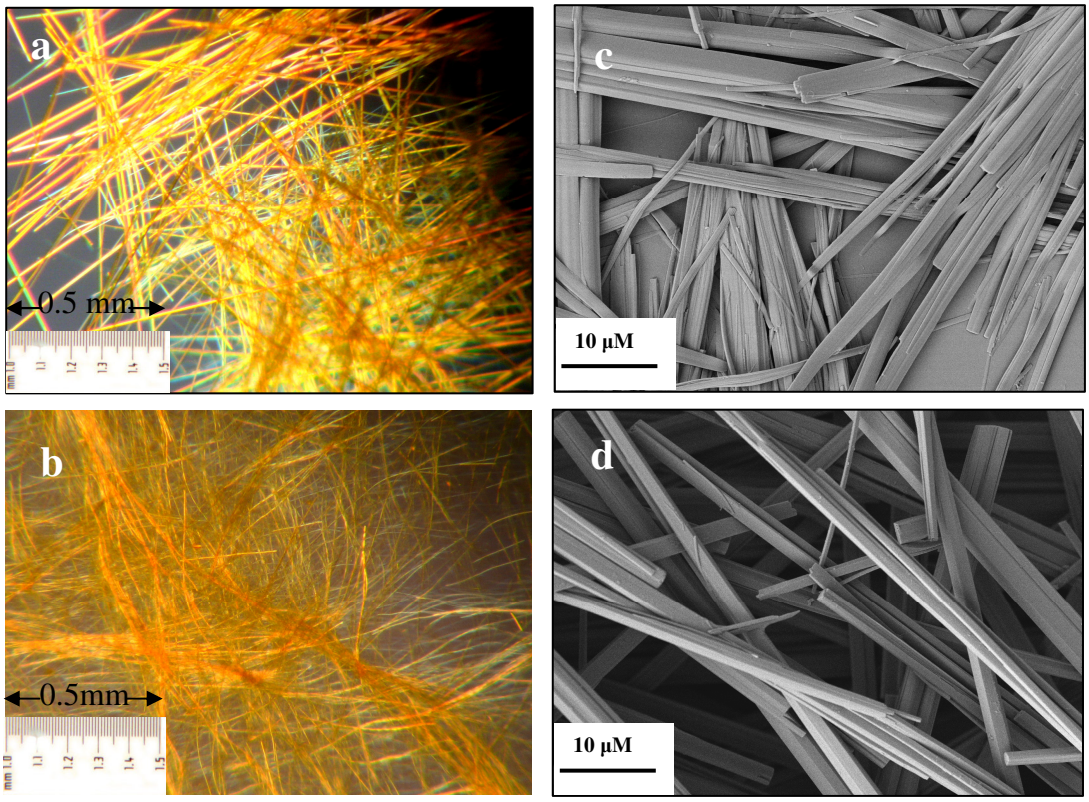


Acetoguanamine [2,4-diamino-6-methyl-s-triazine (**D**)]

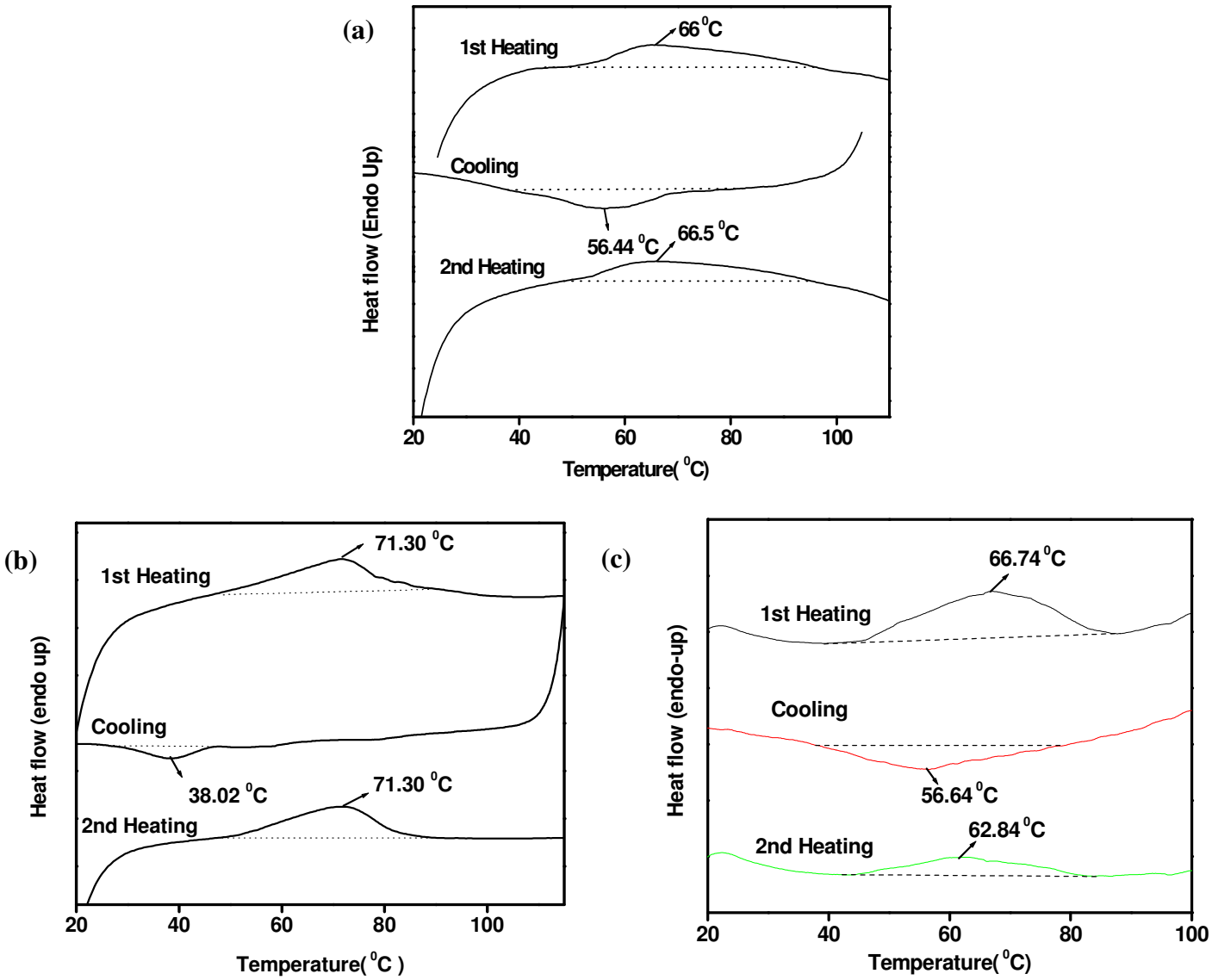
Supporting Table ST1: Life time and relative amplitude values of pure R solution and RS11, RD11 gels at same concentration of R at 30^0 C.

Systems	τ_1 (ns)	Relative amplitudes (a_1)	τ_2 (ns)	Relative amplitudes (a_2)	τ_3 (ns)	Relative amplitudes (a_3)	Av. Life time (ns)
Pure R	2.30	0.10	4.80	0.87	0.82	0.03	4.43
RS11	2.24	0.19	3.326	0.81	-	-	3.12
RD11	1.367	0.13	4.70	0.78	0.28	0.09	3.87

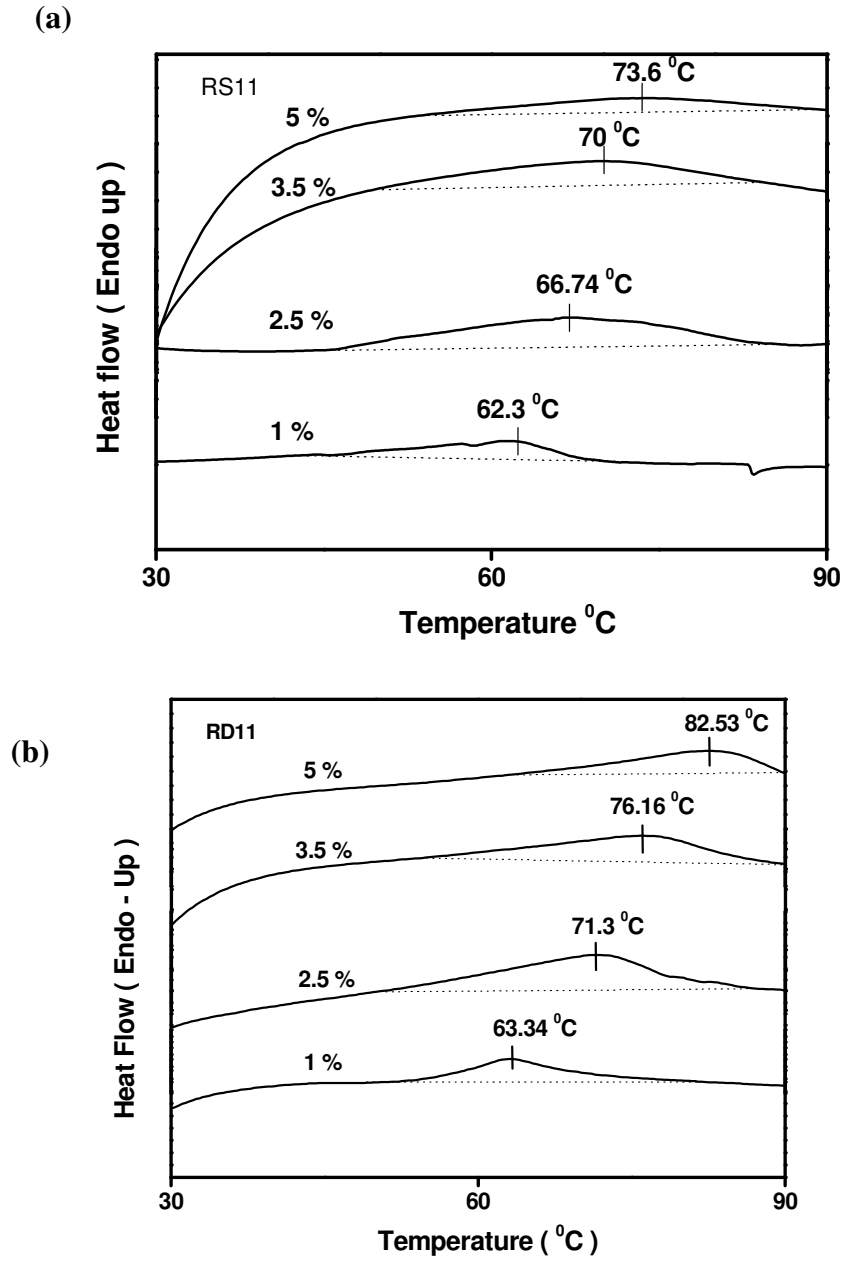
Supporting Figure S1: Polarised optical micrograph of hydrogel of (a) RS11 (1 % w/v) & (b) RB11 (1% w/v); FESEM micrographs of xerogels of above (c) RS11 and (d) RB11 hydrogels.



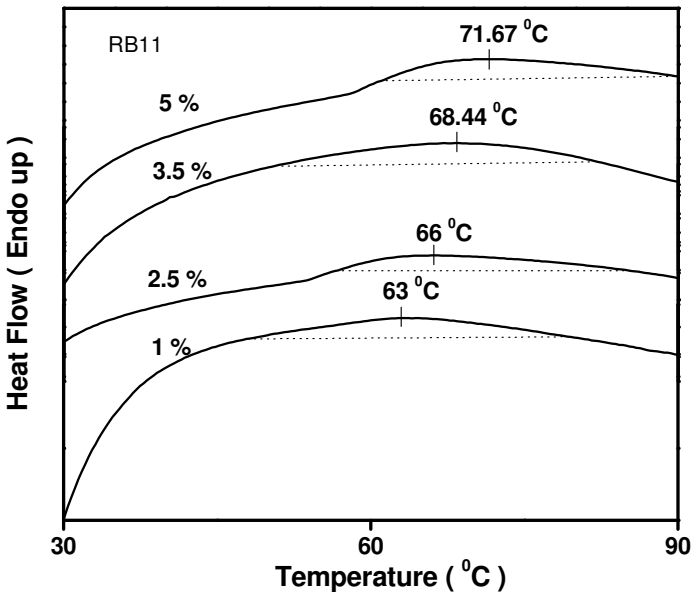
Supporting Figure S2: DSC thermograms of (a) RB11 (b) RD11 and (c) RS11 2.5 % hydrogels (10 ^{0}C/min heating and 5 ^{0}C/min cooling rates).



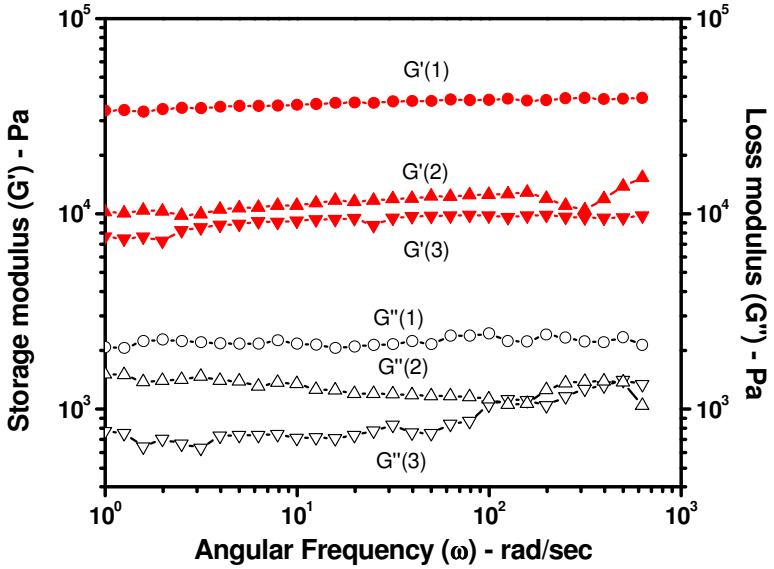
Supporting Figure S3: DSC thermograms of gels at indicated compositions (% W/V) prepared after homogenization at 90^0C and then keeping at 30^0C for 1day (heating rate of 10^0/ min): (a) RS11 gels, (b) RD11 gels and (c) RB11 gels.



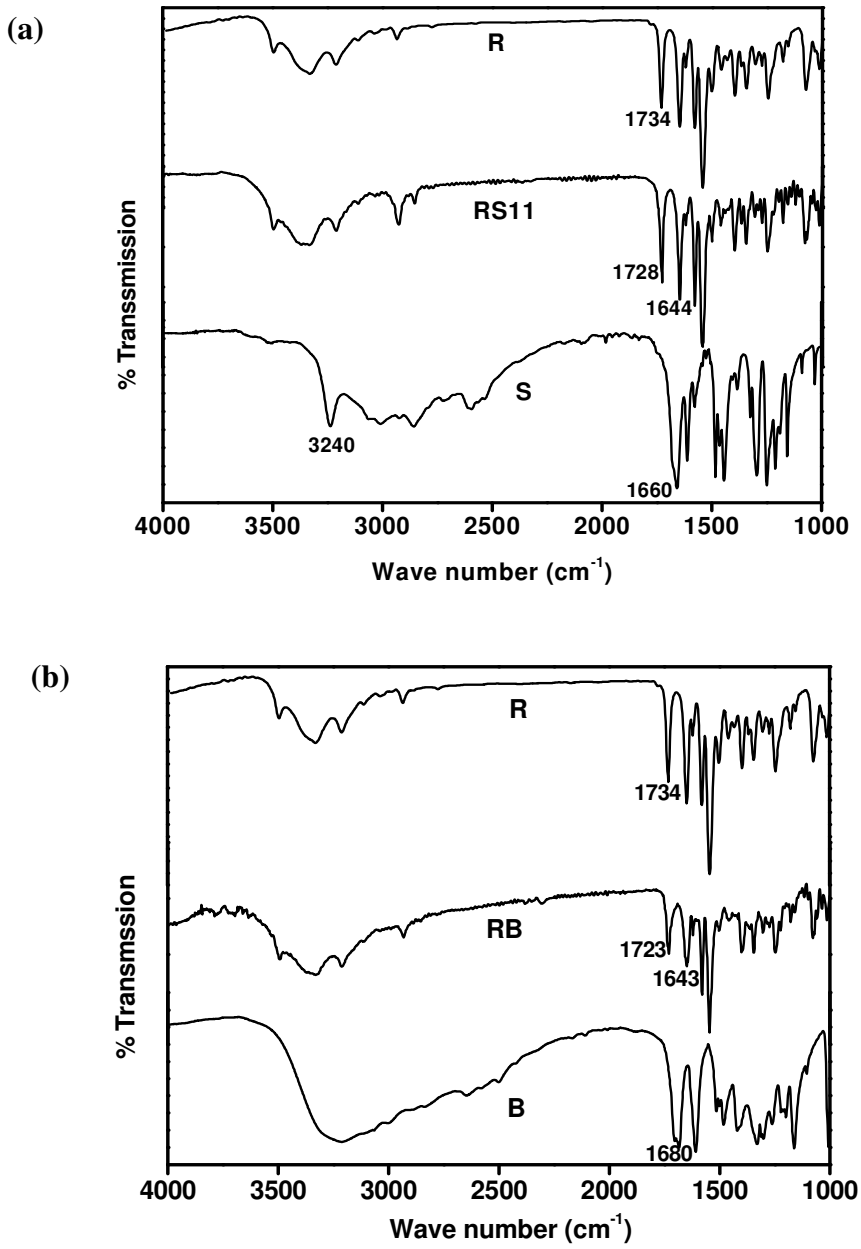
(c)

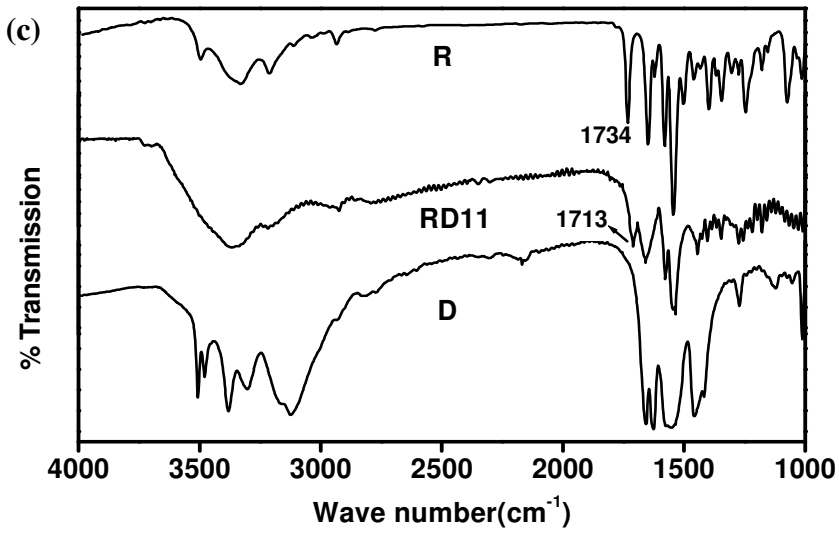

RB11
71.67 °C
5 %
68.44 °C
3.5 %
66 °C
2.5 %
63 °C
1 %
Heat Flow (Endo up)
30
60
90
Temperature (°C)

Supporting Figure S4. (a) Storage (G') and loss (G") modulus vs. frequency plot and (b) Storage modulus (G') vs % strain plot of RD11

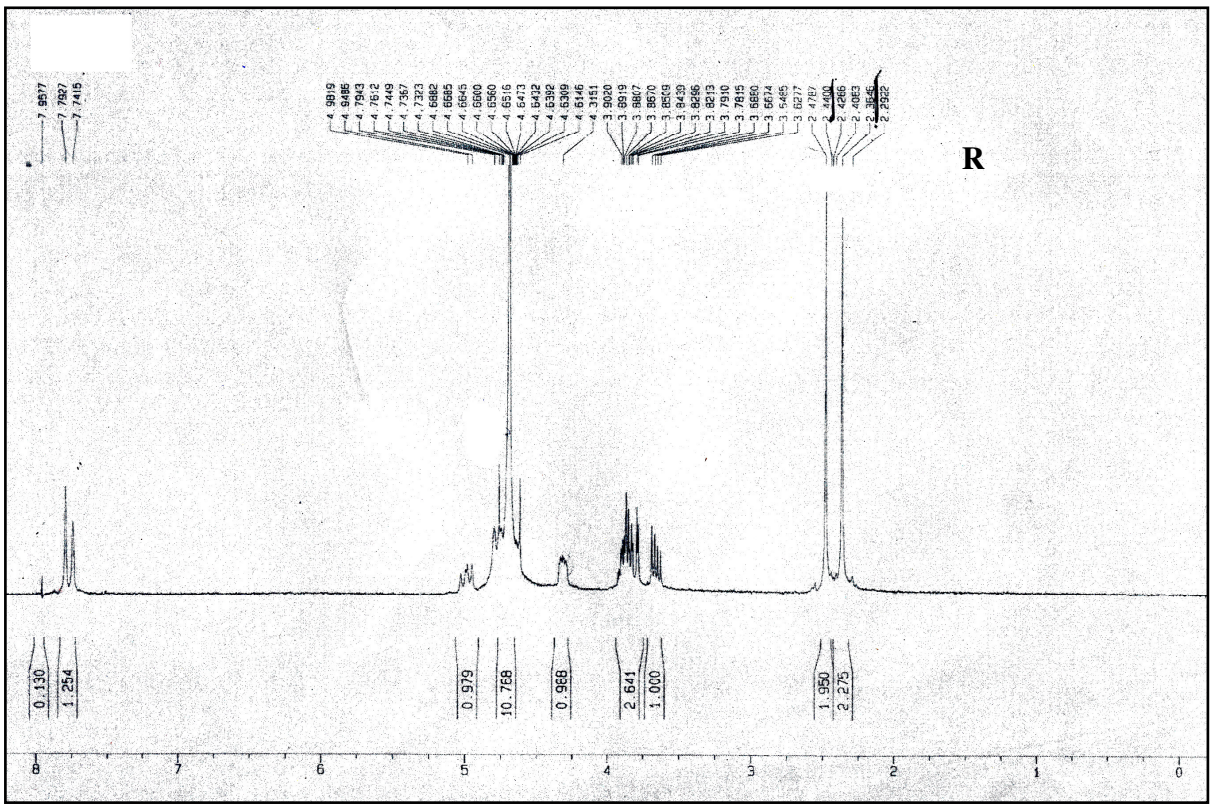


Supporting Figure S5: FTIR spectra of xerogels of (a) RS11 (b) RB11 and (c) RD11along with the pure components R, B, D and S.

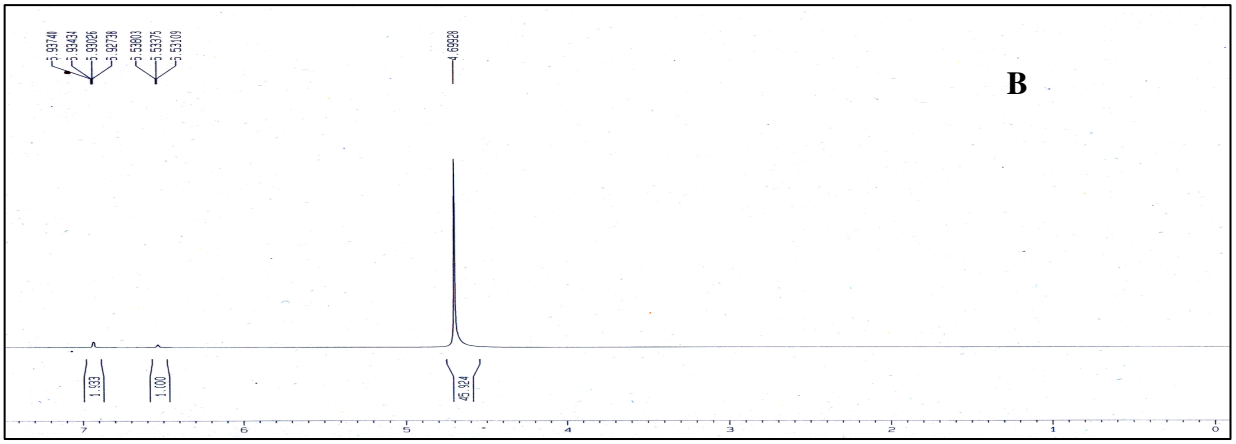


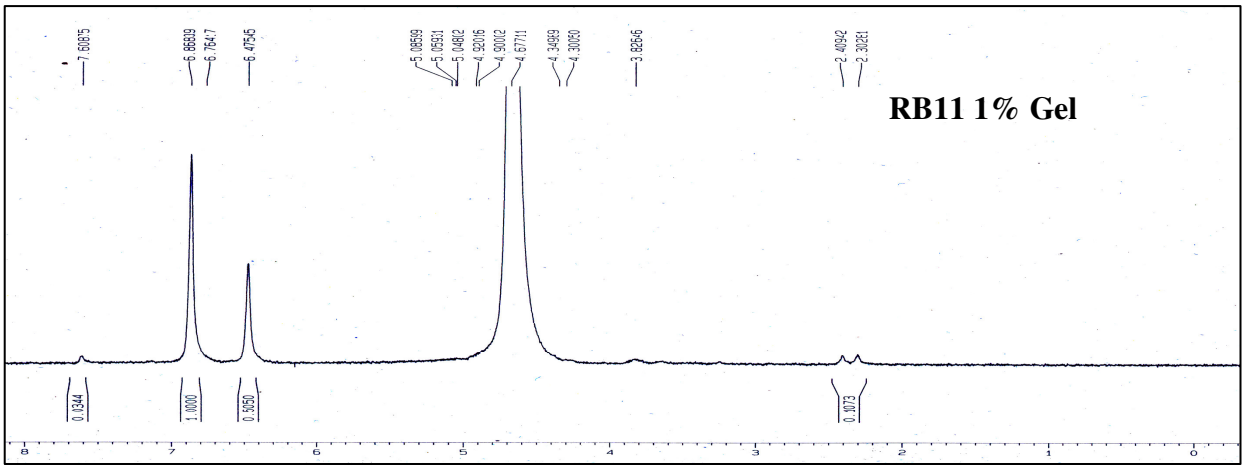

(c)
R
1734
RD11
1713
D
% Transmission
4000
3500
3000
2500
2000
1500
1000
Wave number(cm-1)

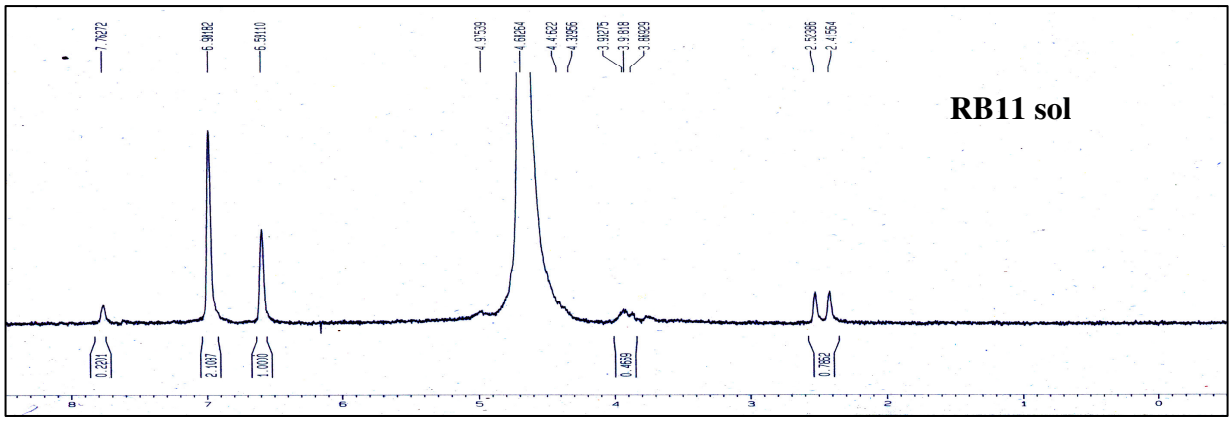
Supporting Figure S6: ^{1}H NMR spectrum of R in D_2O.



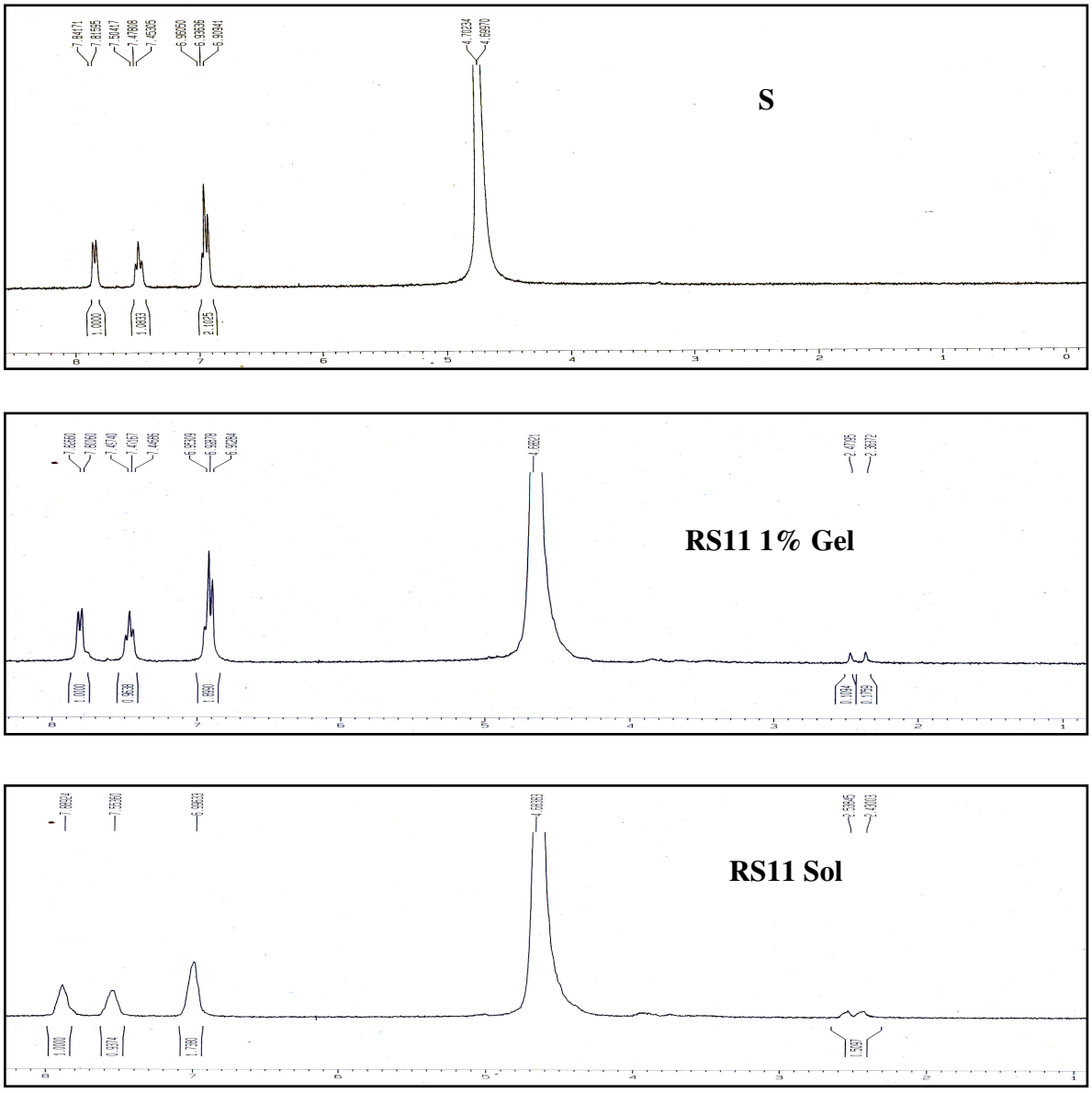
Supporting Figure S7: ^{1}H NMR spectrum of B, RB11 gel and RB11 sol in D_2O.



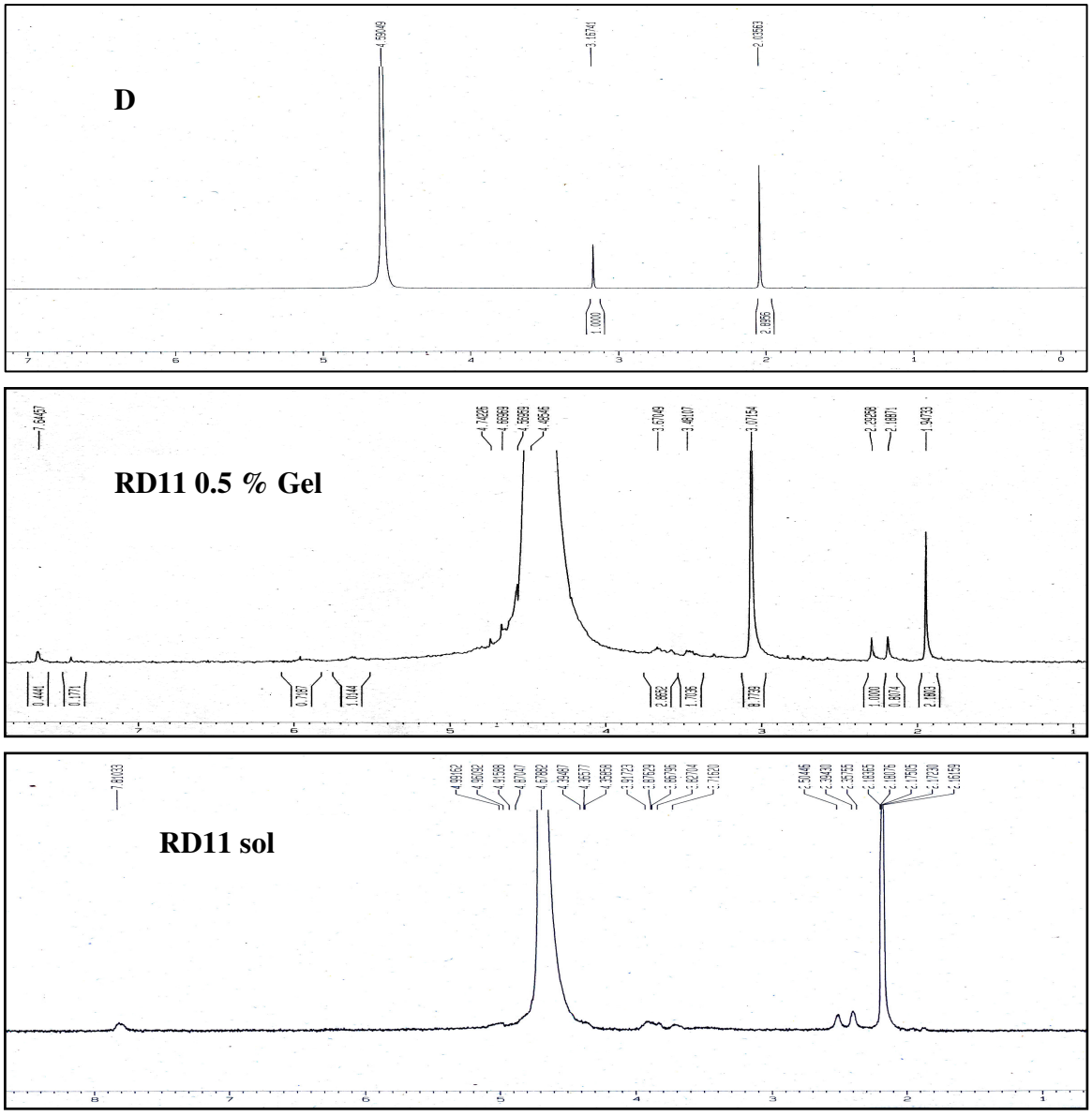




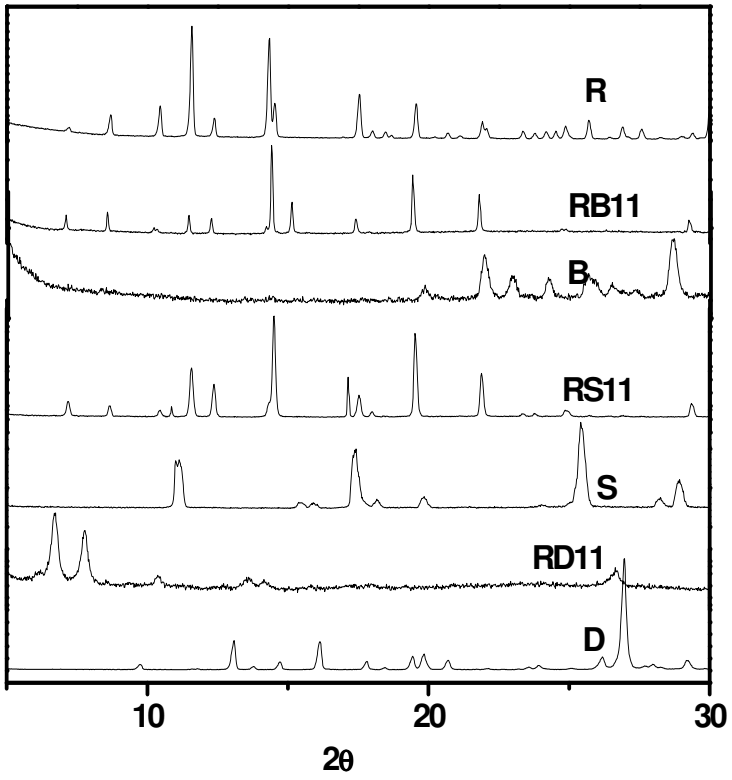
Supporting Figure S8: ^{1}H NMR spectrum of S, RS11 gel and RS11 sol in D_2O.



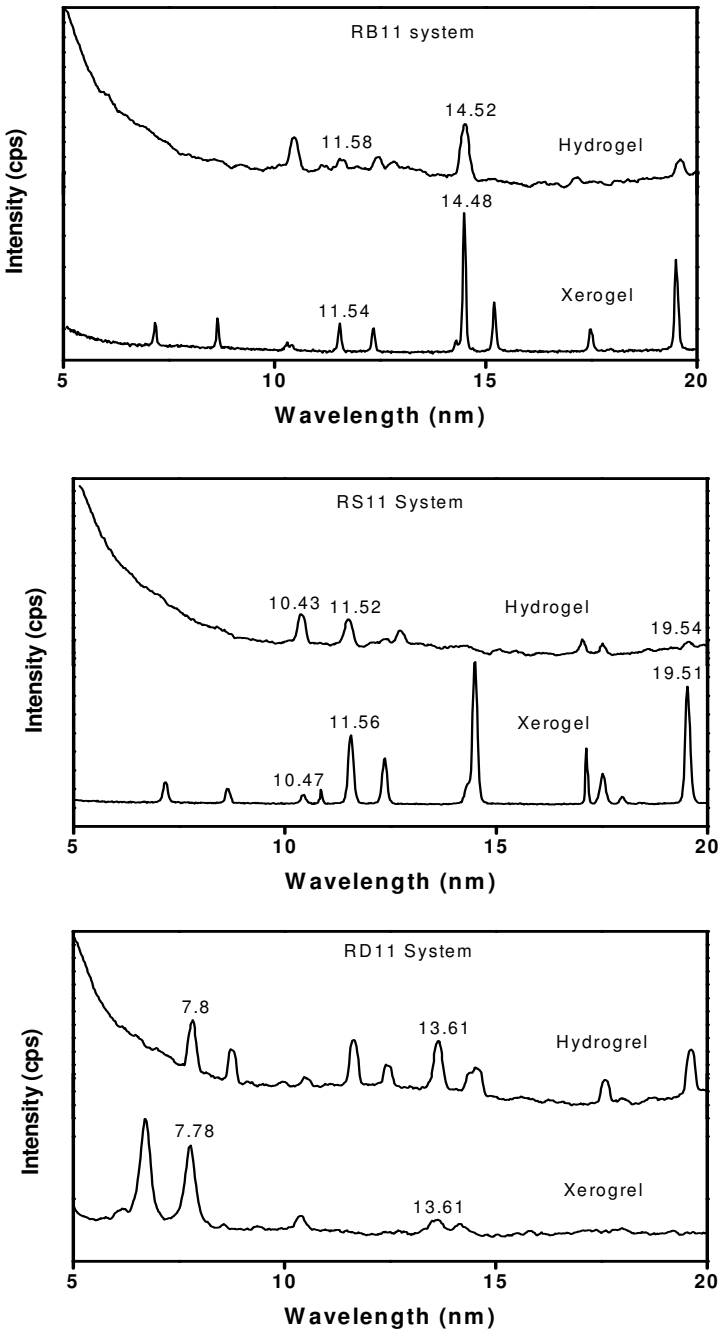
Supporting Figure S9: ^{1}H NMR spectrum of D, RD11 gel and RD11 sol in D_2O.



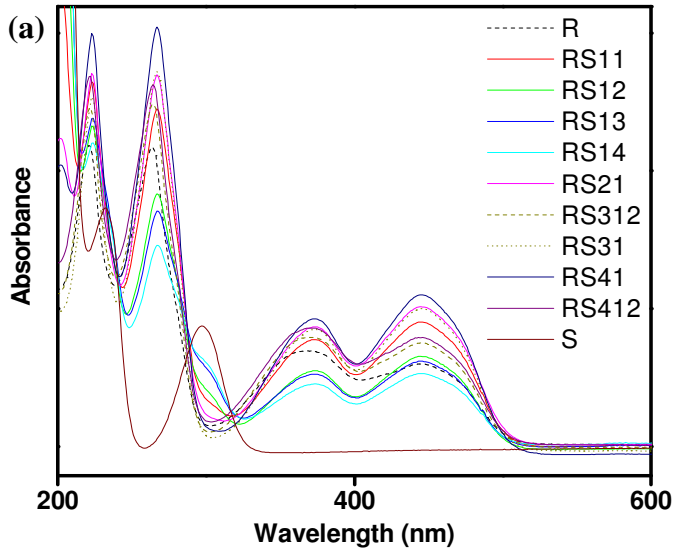
Supporting Figure S10. WAXS patterns of xerogels of RB11, RS11 and RD11 with pure R, B, S and D.

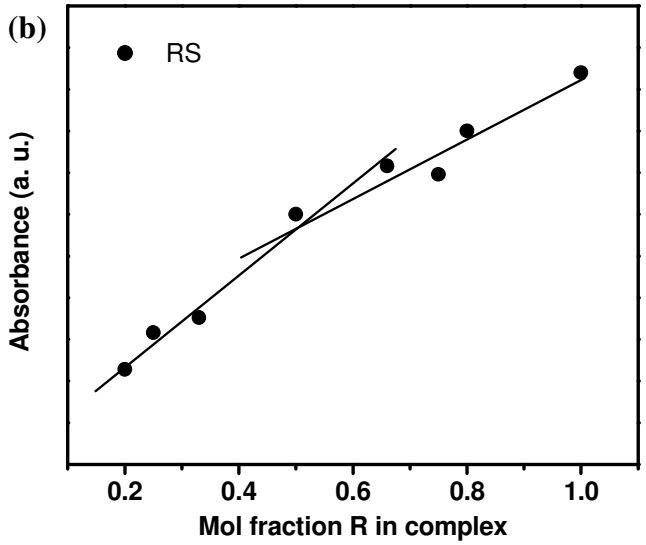


Supporting Figure S11: Comparison XRD spectra of xerogels and hydrogels of RB11, RS11 and RD11 systems at 30^0C.

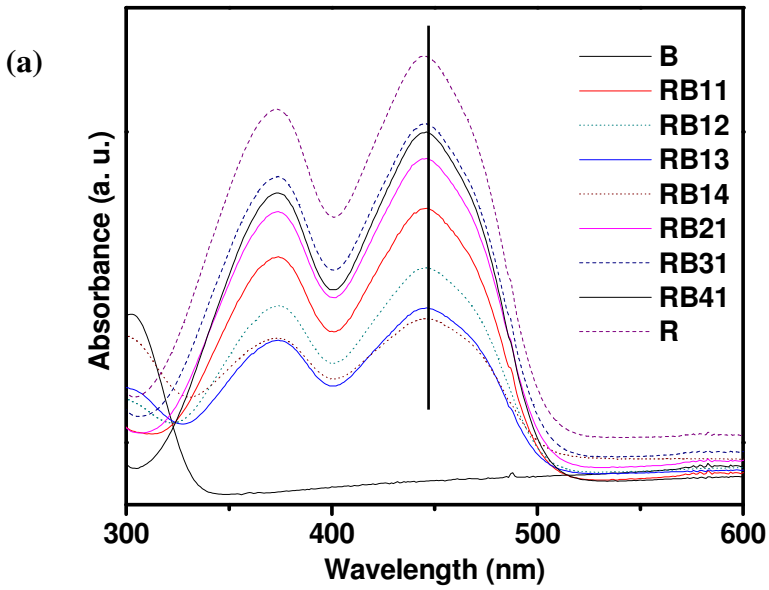


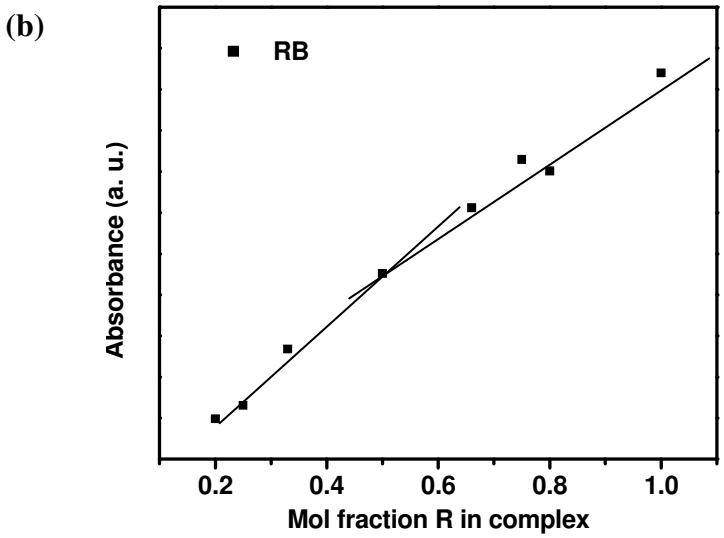
Supporting Figure S12: (a) UV-vis spectra of RS complex sols, pure R and pure S in solution (at 0.01 % w/v concentration) and (b) plot of absorbance at 445 nm vs. mol fraction of R in different RS complexes.



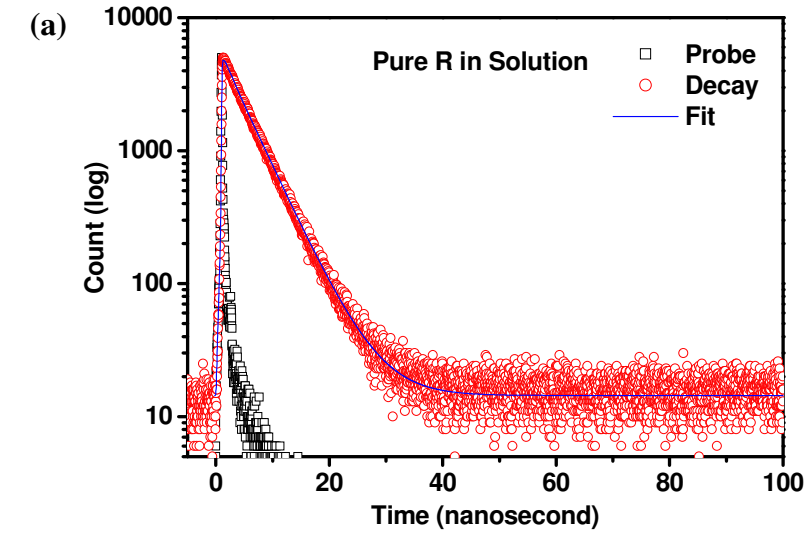


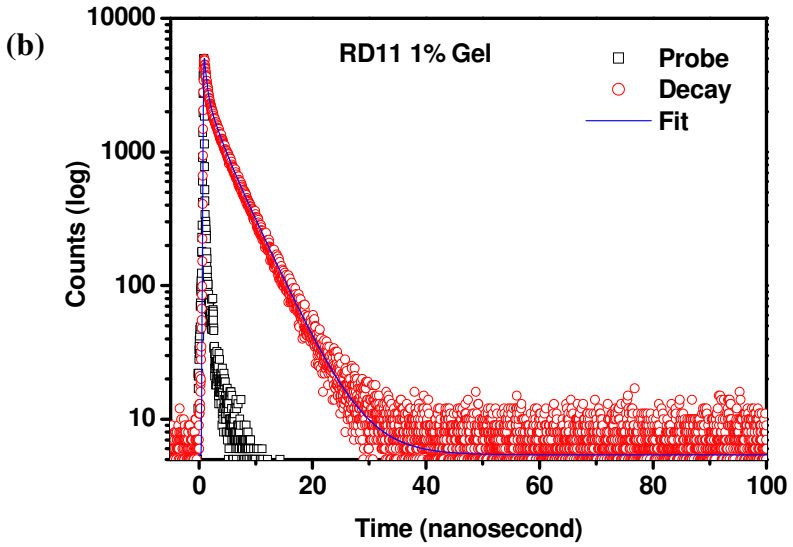
Supporting Figure S13: (a) UV-vis spectra of RB complex sols, pure R and pure B in solution (at 0.01 % w/v concentration) and (b) plot of absorbance at 445 nm vs. mol fraction of R in different RB complexes.



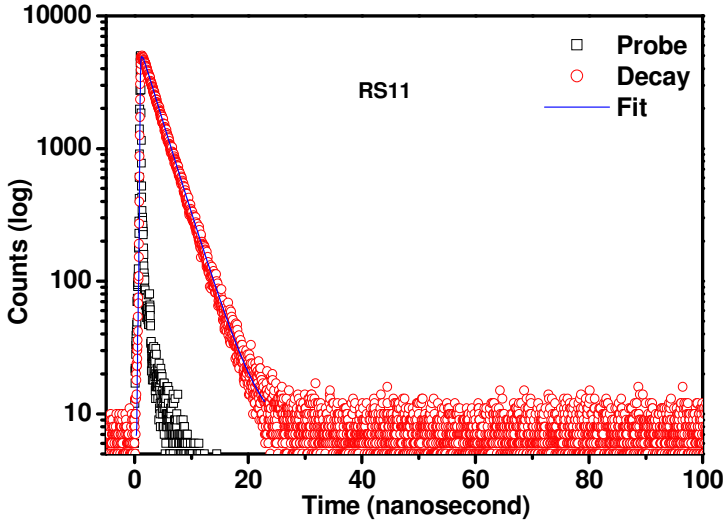


Supporting Figure S14: Time-resolved fluorescence decay of (a) R (b) RD11 gel and (c) RS11 hydrogel at 25^0C (λ_{ex} =375 nm). The sharp profile on the left is the lamp profile.





(c)


10000
1000
100
10
Counts (log)
0
20
40
60
80
100
Time (nanosecond)
RS11
Probe
Decay
Fit

Supporting Figure S15: Fluorescence spectra of RS11 1% (a and b) and RB11 1% (c and d) gel at different pH (4, 5, 6.7, 8 and 9.2) and Temperature (25^0 – 75^0C).

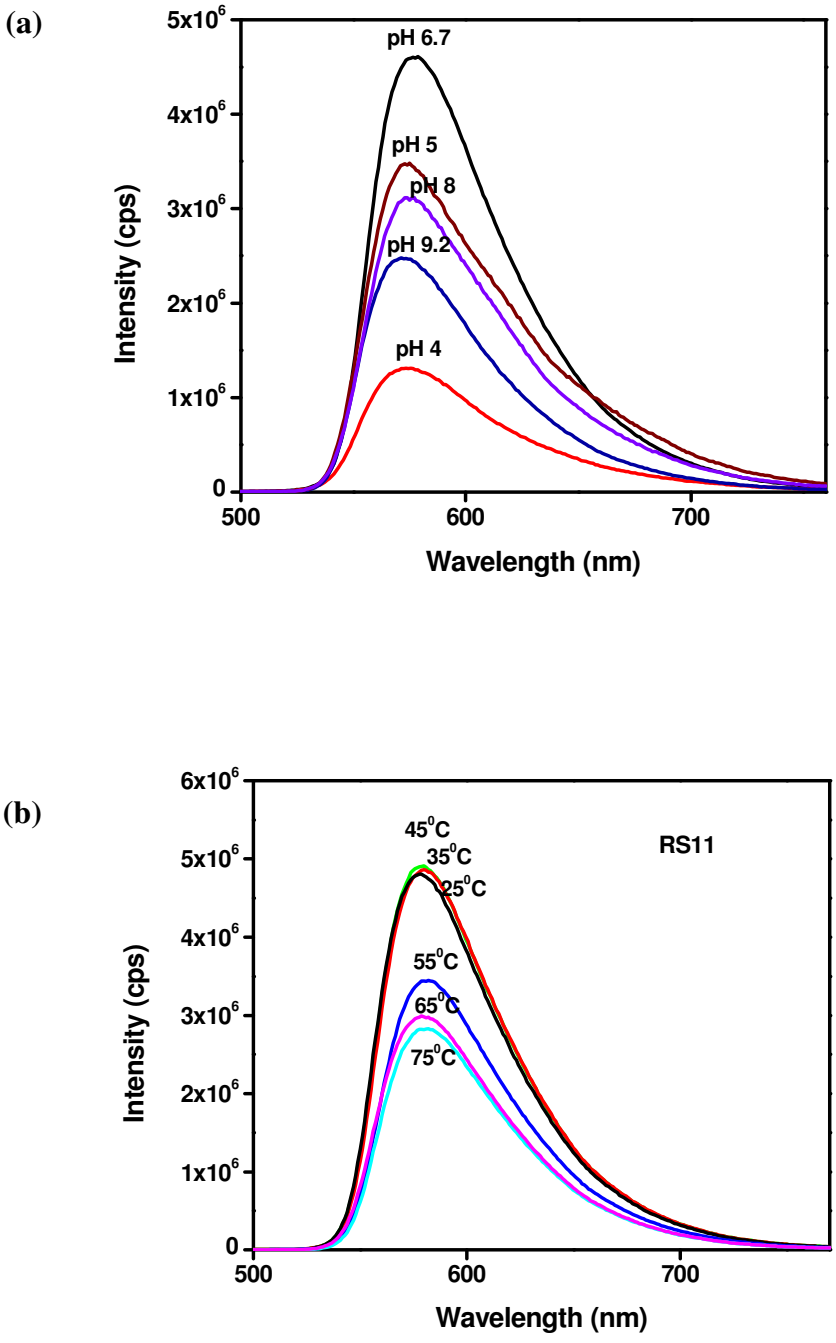
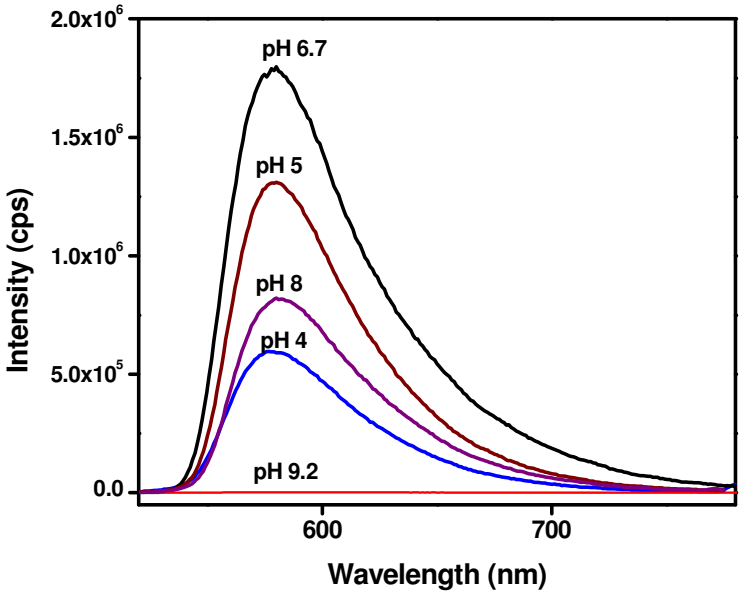
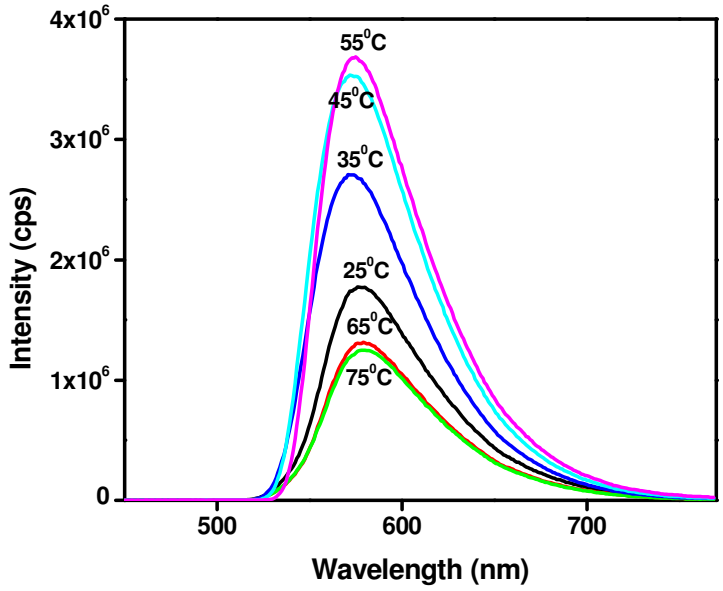


Figure 11

(c)


2.0x10^6
1.5x10^6
1.0x10^6
5.0x10^5
0.0
Intensity (cps)
pH 6.7
pH 5
pH 8
pH 4
pH 9.2
600
700
Wavelength (nm)

(d)


4x10^6
3x10^6
2x10^6
1x10^6
0
Intensity (cps)
55°C
45°C
35°C
25°C
65°C
75°C
500
600
700
Wavelength (nm)

Supporting Figure S16: Comparison of PL- spectra of dried gels of RD11, RB11 and RS11 systems (Inset PL spectra of pure R) at 30^0 C.