

Arabinose based gelators: Rheological characterization of the gels and phase selective organogelation of crude-oil

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1. Gelation Tests

Gelation test were carried out by adding exact weights of compounds **3a-3g** individually to 1 ml of appropriate solvent in a vial. The vial was sealed and suspension was heated to dissolve the compound to get a clear solution. The solution was allowed to cool after which gelation was tested by inverting the sample vial. If the inverted vial was able to hold the system, it was considered as a gel. Apart from **3a** and **3g** the other triazolylarabinoside derivatives **3b**, **3c-f** were also tested in the same manner but they were not able to form gels in any solvent.

2. Determination of Minimum Gelation Concentration (MGC)

1 ml of solvent was taken in 5 ml of sample vial, 1 mg of gelator **3a** and **3g** was added to the solvent which was then heated till a clear solution was obtained. Then the solution was cooled and the vial inverted to confirm gelation. If partial or no gelation was observed, the cycle was repeated adding 1 mg of **3a** or **3g** at the beginning of each heating cooling cycle till complete gelation of the solvent was observed by inversion of the vial.

3. Gel characterization

3.1 Optical Microscopy

An optical microscope (Olympus - CH20i) equipped with a digital camera (Nikon - Eclipse E200 MV Pole) for digital imaging was used for analyzing the microstructure of the organogels. The experiments were carried out by placing a small amount of the gel sample at a particular concentration on a 3 inch x 2 inch glass slide and viewing it with the microscope.

3.2 Field Emission Scanning Electron Micrographs (FESEM)

The experiments were performed by using a Zeiss supra-55 FESEM. The xerogels of the samples were prepared by dropcasting the hot 1% (w/v) solution of gelator **3a** or **3g** in gelling solvent on a glass slide (2mm x 2mm) and drying them overnight in air inside a vacuum desiccator. The xerogel was then placed on a stub which was then coated with gold by a Quorum -Q150RES sputter coater under vacuum of 5×10^{-5} milibar and a current of 20 mA for 2 minutes.

3.4 Atomic force microscopy (AFM)

The experiments were performed by using a Bruker Dimension Icon instrument. The samples were prepared by dropcasting a dilute solution of gelator **3a** and **3g** in *m*-xylene solvent on a

glass slide (2mm x 2mm) and drying them overnight under vacuum inside a dessicator. AFM images of the samples were obtained using Tapping Mode at 1 Hz scanning rate with a silicon cantilever tip (RFESP-MPP-21100-10) at a resonance frequency of 75 kHz and a spring constant of 3 Nm^{-1} .

3.5 Wide Angle X-ray Diffraction (WXR)

The xerogels of the sample were prepared by dissolving 3a (100 mg) and 3g (100 mg) in 10 mL of Benzene in a beaker and drying them overnight in a vacuum dessicator. The WXR diffractogram of the samples were recorded on a ProroAXRD diffractometer. X-rays of wavelength 1.54 \AA were used.

4 Table S1. Gelation ability of **3a-g** with various solvents.^a

Compound Solvent	3a (MGC, ^b T _g)	3b	3c	3d	3e	3f	3g(MGC, ^b T _g)
Benzene	G, (1.0%, 44-45 °C)	S	S	S	S	S	G, (0.7%, 49-50 °C)
Toluene	G, (1.0%, 46-47 °C)	S	S	S	S	S	G, (0.5%, 53-54 °C)
<i>o</i> -xylene	G, (0.9%, 47-48 °C)	S	S	S	S	S	G, (0.5%, 57-58 °C)
<i>m</i> -xylene	G, (0.7%, 48-49 °C)	S	S	S	S	S	G, (0.5%, 52-53 °C)
<i>p</i> -xylene	G, (0.9%, 46-47 °C)	S	S	S	S	S	G, (0.5%, 51-52 °C)
Chlorobenzene	G, (1.0%, 45-46 °C)	S	S	S	S	S	G, (0.7%, 53-54 °C)
Hexane	I	I	I	I	I	I	I
<i>n</i> -heptane	I	I	I	I	I	I	I
Cyclohexane	I	I	I	I	I	I	I
Methylcyclohexane	I	I	I	I	I	I	I
DCM	S	S	S	S	S	S	S
Chloroform	S	S	S	S	S	S	S
Ethyl acetate	S	S	S	S	S	S	S
Aceto nitrile	S	S	S	S	S	S	S
Ethanol	G, (1.0, 48-49 °C)	S	S	S	S	S	S
Methanol	S	S	S	S	S	S	S
<i>n</i> -butyl alcohol	S	S	S	S	S	S	S
Amyl alcohol	S	S	S	S	S	S	S
Water	I	I	I	I	I	I	I
DMF	S	S	S	S	S	S	S
DMSO	S	S	S	S	S	S	S
Kerosene	G (0.3%, 69-70 °C)	S	S	S	S	S	G (0.3%, 71-72 °C)
Petrol	G, (0.3%, 63-64 °C)	S	S	S	S	S	G, (0.3%, 61-62 °C)
Diesel	G, (0.3%, 66-67 °C)	S	S	S	S	S	G, (0.3%, 68-69 °C)

^a G = Gel; S = Solution; I = Insoluble. ^b (w/v).

5 Figures and graphs

5.1 Figures of gels at various concentrations

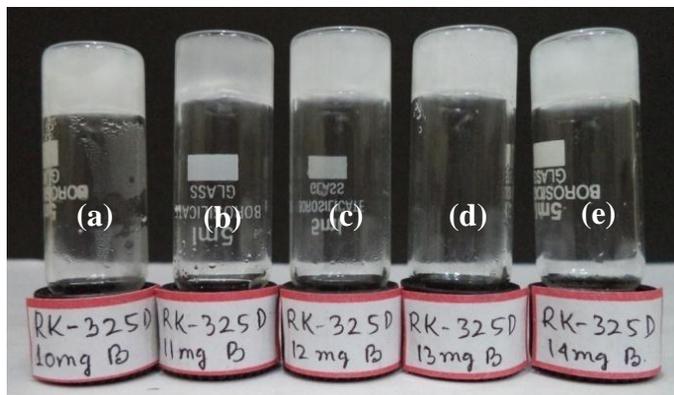


Figure S1.Gels from Benzene and **3a** at various concentrations of **3a** (a) at 1.0% (w/v) (b) at 1.1% (w/v) (c) at 1.2% (w/v) (d) at 1.3% (w/v) (e) at 1.4% (w/v).

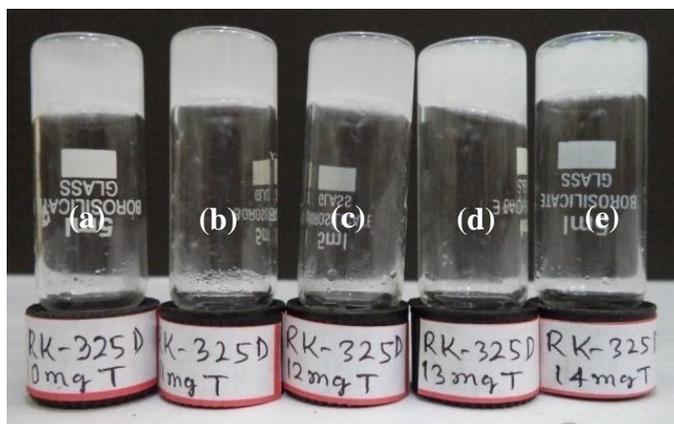


Figure S2.Gels from toluene and **3a** at various concentrations of **3a** (a) at 1.0% (w/v) (b) at 1.1% (w/v) (c) at 1.2% (w/v) (d) at 1.3% (w/v) (e) at 1.4% (w/v).

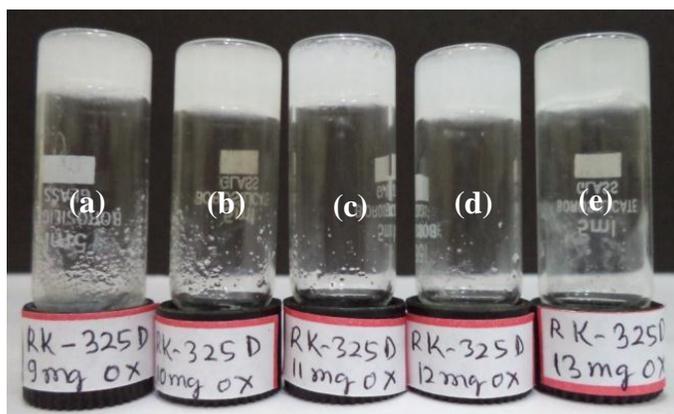


Figure S3.Gels from *o*-xylene and **3a** at various concentrations of **3a** (a) at 0.9% (w/v) (b) at 1.0% (w/v) (c) at 1.1% (w/v) (d) at 1.2% (w/v) (e) at 1.3% (w/v).

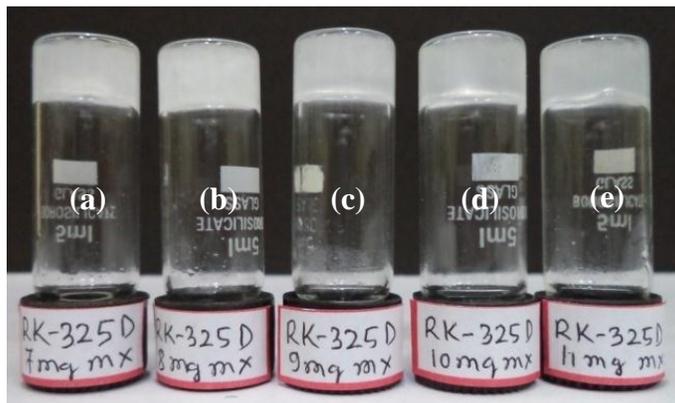


Figure S4.Gels from *m*-xylene and **3a** at various concentrations of **3a** (a) at 0.7% (w/v) (b) at 0.8% (w/v) (c) at 0.9% (w/v) (d) at 1.0% (w/v) (e) at 1.1% (w/v).

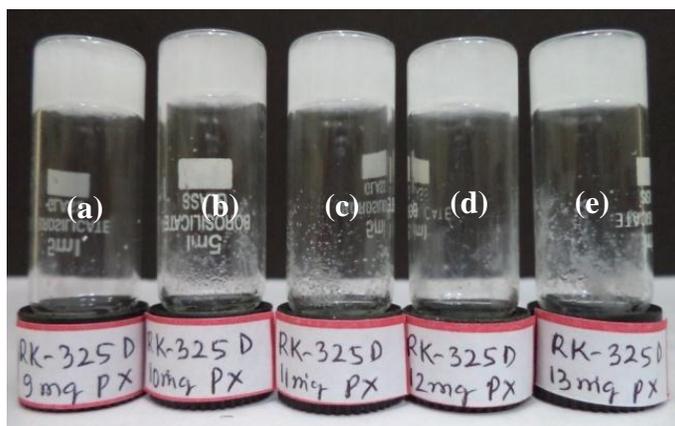


Figure S5.Gels from *p*-xylene and **3a** at various concentrations of **3a** (a) at 0.9% (w/v) (b) at 1.0% (w/v) (c) at 1.1% (w/v) (d) at 1.2% (w/v) (e) at 1.3% (w/v).

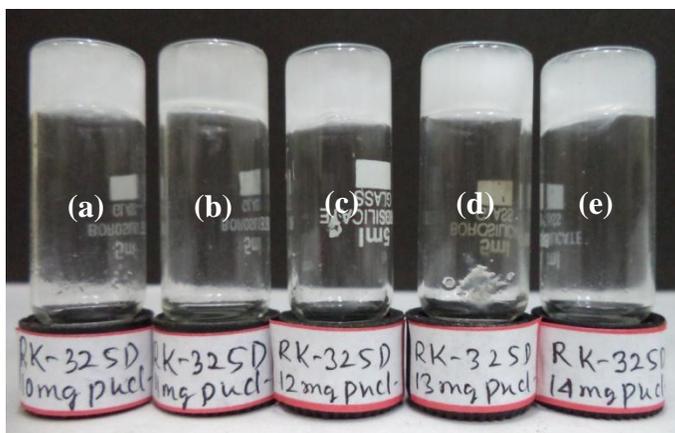


Figure S6.Gels from chlorobenzene and **3a** at various concentrations of **3a** (a) at 1.0% (w/v) (b) at

1.1% (w/v) (c) at 1.2% (w/v) (d) at 1.3% (w/v) (e) at 1.4% (w/v).

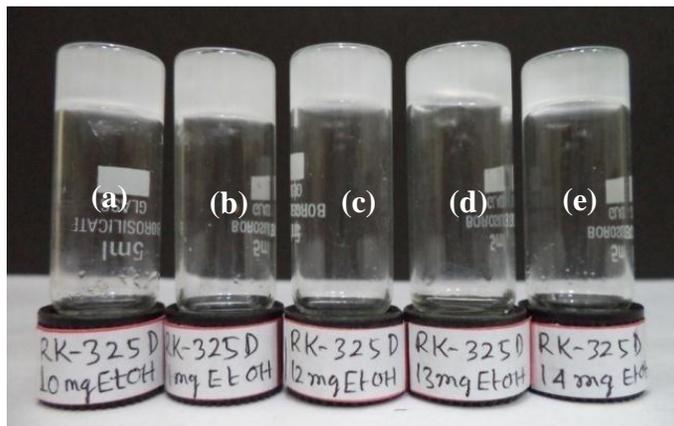


Figure S7.Gels from ethanol and **3a** at various concentrations of **3a** (a) at 1.0% (w/v) (b) at 1.1% (w/v) (c) at 1.2% (w/v) (d) at 1.3% (w/v) (e) at 1.4% (w/v).

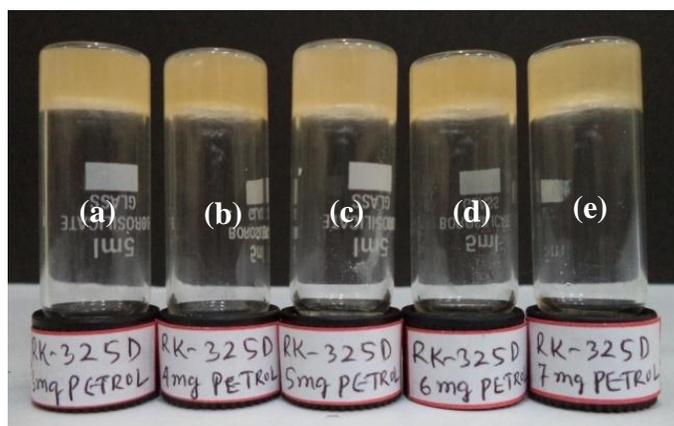


Figure S8.Gels from petrol and **3a** at various concentrations of **3a** (a) at 0.3% (w/v) (b) at 0.4% (w/v) (c) at 0.5% (w/v) (d) at 0.6% (w/v) (e) at 0.7% (w/v).

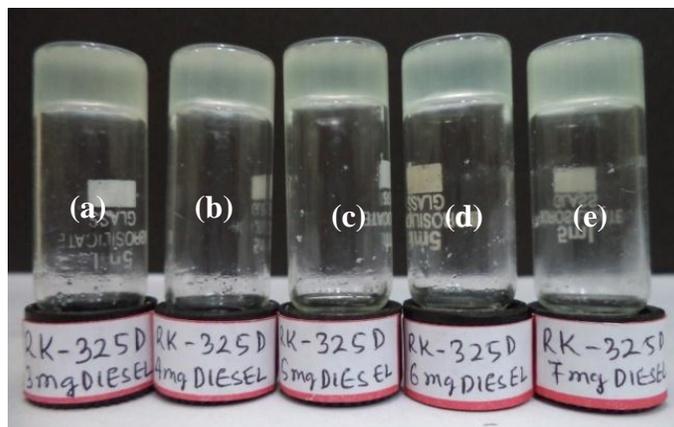


Figure S9.Gels from diesel and **3a** at various concentrations of **3a** (a) at 0.3% (w/v) (b) at 0.4% (w/v) (c)

at 0.5% (w/v) (d) at 0.6% (w/v) (e) at 0.7% (w/v).

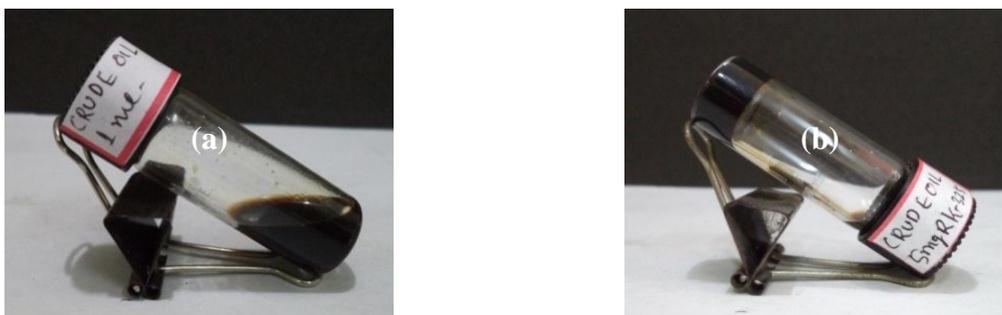


Figure S10.Gels from Crude oil of **3a** at minimum gelation concentrations at 0.5% (w/v). (a) 1 ml Crude oil (b) Crude oil gel

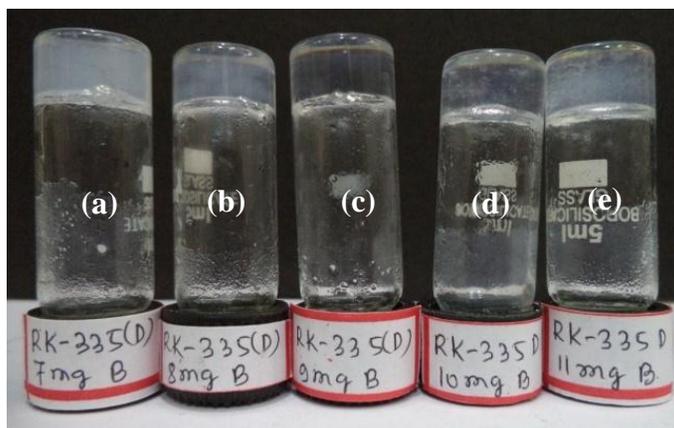


Figure S11.Gels from benzene and **3g** at various concentrations of **3g**(a) at 0.7% (w/v) (b) at 0.8% (w/v) (c) at 0.9% (w/v) (d) at 1.0% (w/v) (e) at 1.1% (w/v).

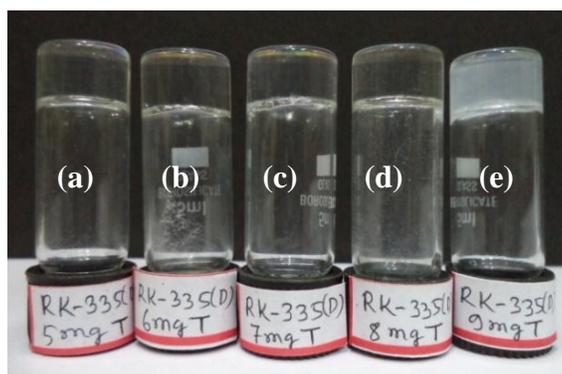


Figure S12.Gels from toluene and **3g** at various concentrations of **3g**(a) at 0.5% (w/v) (b) at 0.6% (w/v) (c) at 0.7% (w/v) (d) at 0.8% (w/v) (e) at 0.9% (w/v).

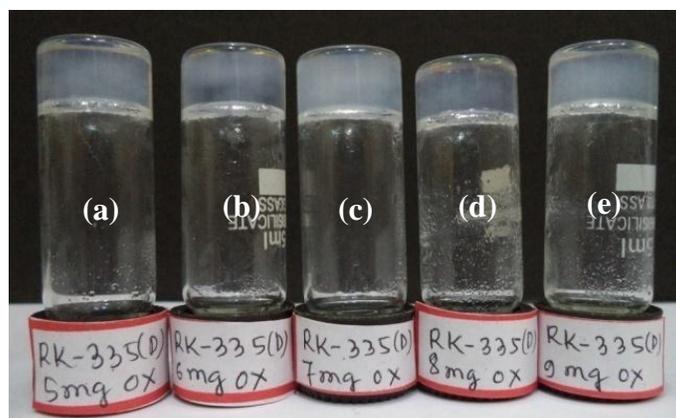


Figure S13.Gels from *o*-xylene and **3g** at various concentrations of **3g**(a) at 0.5% (w/v) (b) at 0.6% (w/v) (c) at 0.7% (w/v) (d) at 0.8% (w/v) (e) at 0.9% (w/v).

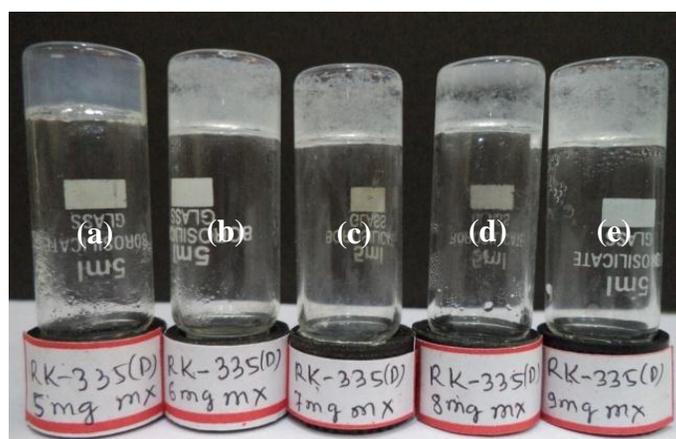


Figure S14.Gels from *m*-xylene and **3g** at various concentrations of **3g**(a) at 0.5% (w/v) (b) at 0.6% (w/v) (c) at 0.7% (w/v) (d) at 0.8% (w/v) (e) at 0.9% (w/v).

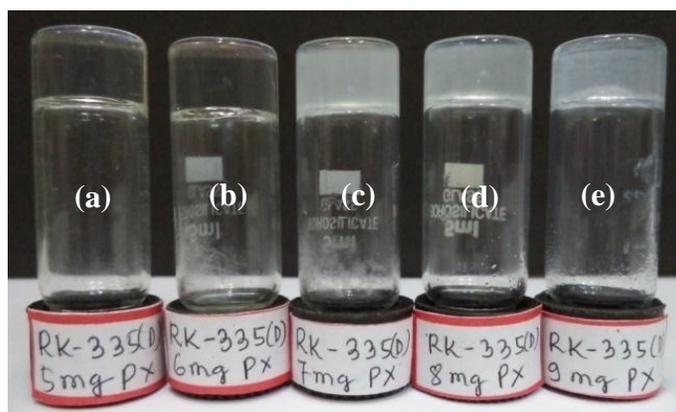


Figure S15.Gels from *p*-xylene and **3g** at various concentrations of **3g**(a) at 0.5% (w/v) (b) at 0.6% (w/v) (c) at 0.7% (w/v) (d) at 0.8% (w/v) (e) at 0.9% (w/v).

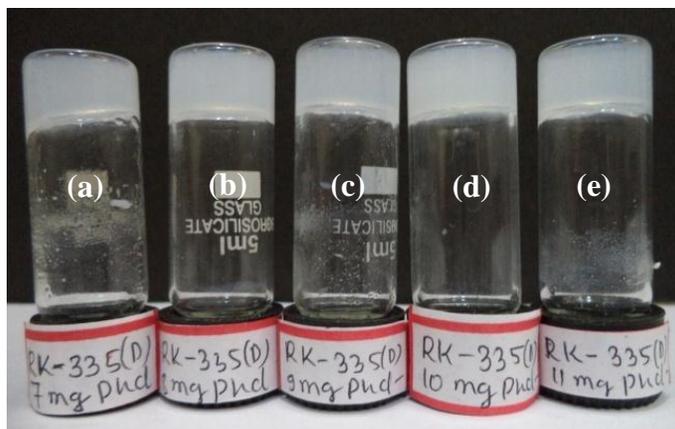


Figure S16.Gels from chlorobenzene and **3g** at various concentrations of **3g**(a) at 0.7% (w/v) (b) at 0.8% (w/v) (c) at 0.9% (w/v) (d) at 1.0% (w/v) (e) at 1.1% (w/v).

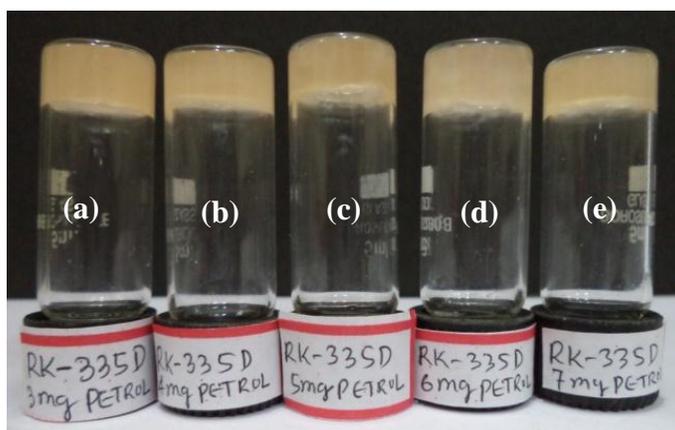


Figure S17.Gels from petrol and **3g** at various concentrations of **3g**(a) at 0.3% (w/v) (b) at 0.4% (w/v) (c) at 0.5% (w/v) (d) at 0.6% (w/v) (e) at 0.7% (w/v).

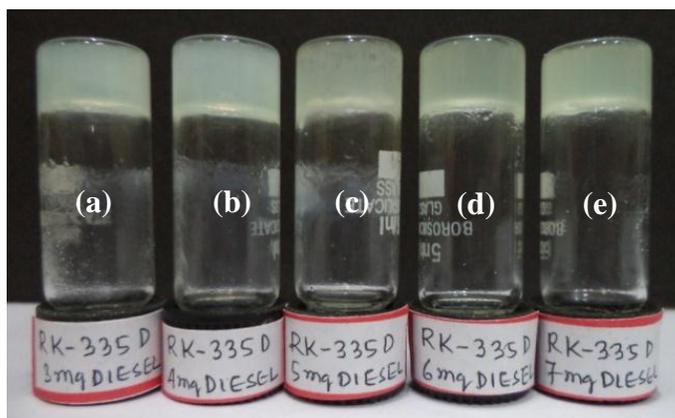


Figure S18.Gels from diesel and **3g** at various concentrations of **3g**(a) at 0.3% (w/v) (b) at 0.4% (w/v) (c) at 0.5% (w/v) (d) at 0.6% (w/v) (e) at 0.7% (w/v).

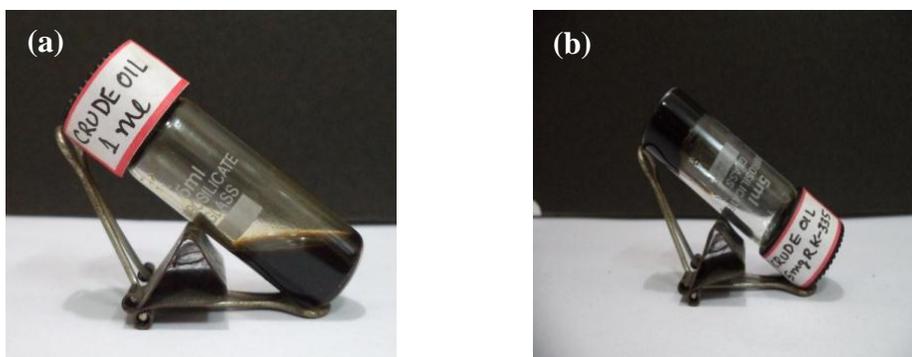


Figure S19. Gelation of crude-oil with gelator **3g** (a) Crude-oil (b) Gelled crude-oil.

5.2 Tables for variation of T_g with concentration

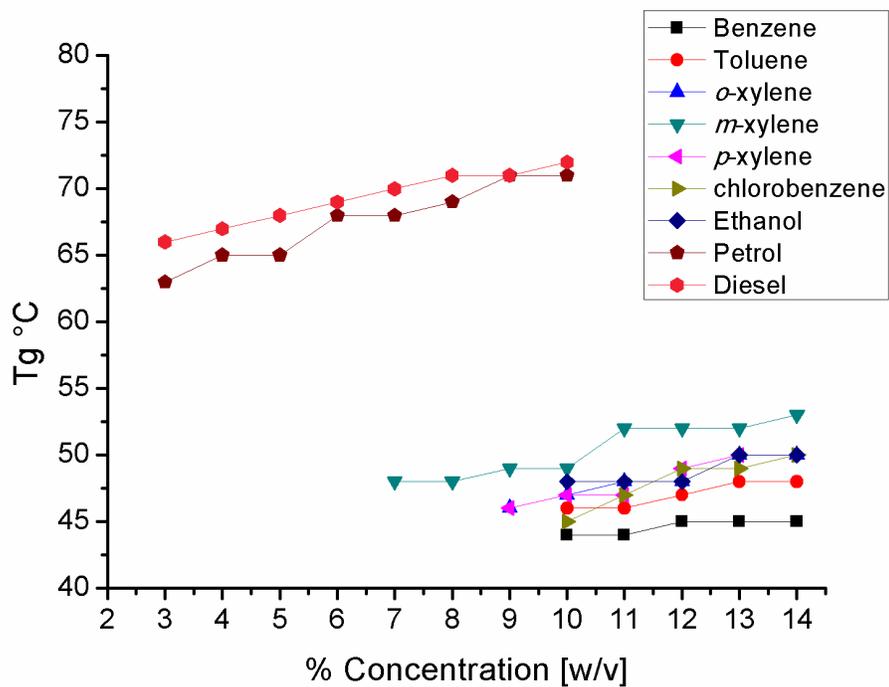


Figure S20. Variation of T_g with concentration for organogels of **3a**.

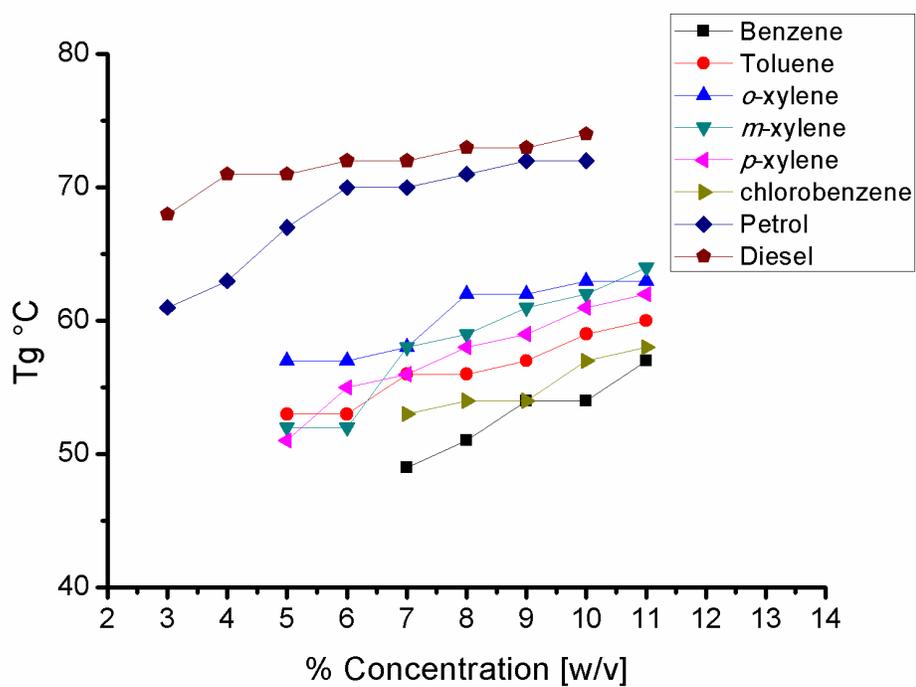


Figure S21. Variation of T_g with concentration for organogels of **3g**.

5.3 Optical microscopy images

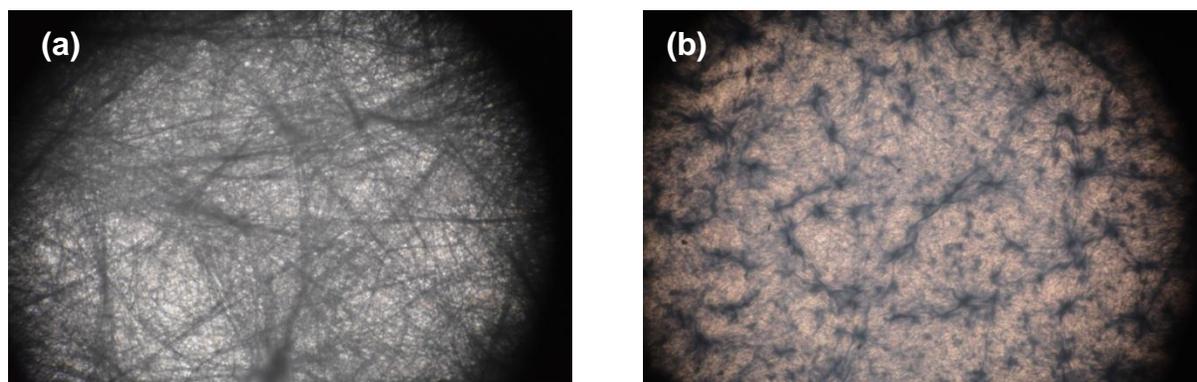


Figure S22. Optical microscopy image for (a) **3a** in *m*-xylene at 1% (w/v) (b) **3g** in *m*-xylene at 1% (w/v) concentration.

5.4 FESEM micrographs

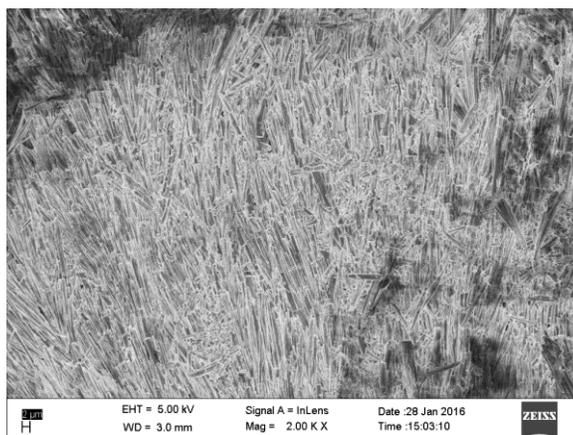


Figure S23.FESEM image of xerogel of **3a** at 1% (w/v) concentration in benzene.

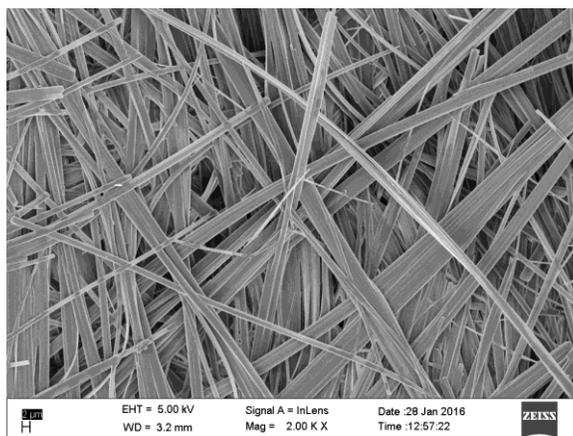


Figure S24.FESEM image of xerogel of **3a** at 1% (w/v) concentration in toluene

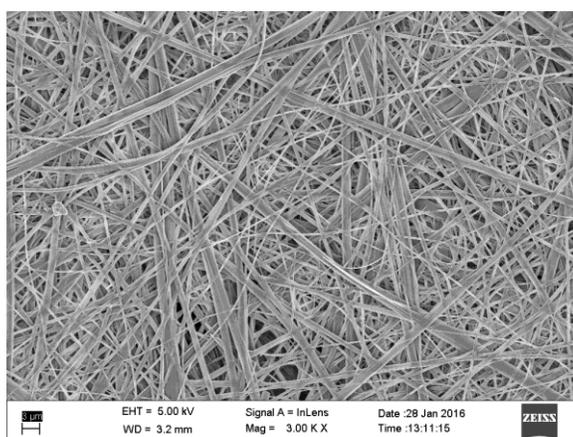


Figure S25.FESEM image of xerogel of **3a** at 1% (w/v) concentration in *o*-xylene

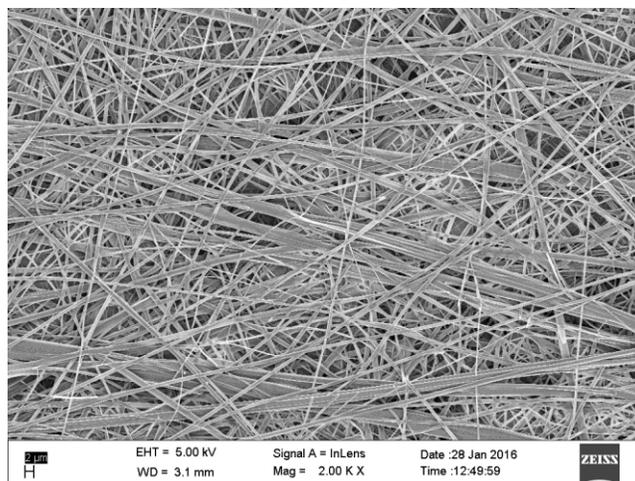


Figure S26.FESEM image of xerogel of **3a** at 1% (w/v) concentration in *m*-xylene

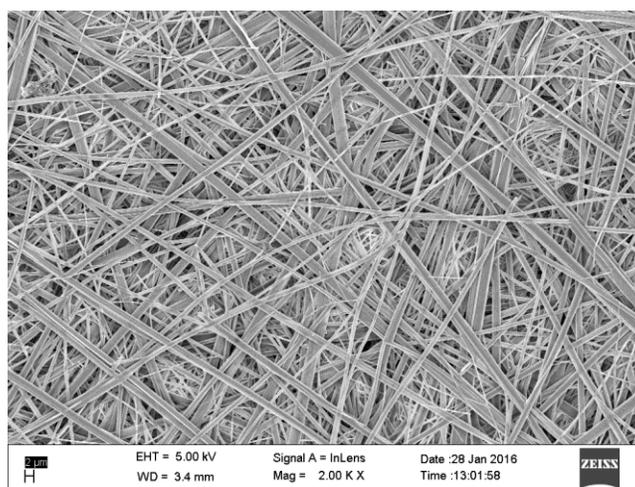


Figure S27.FESEM image of xerogel of **3a** at 1% (w/v) concentration in *p*-xylene

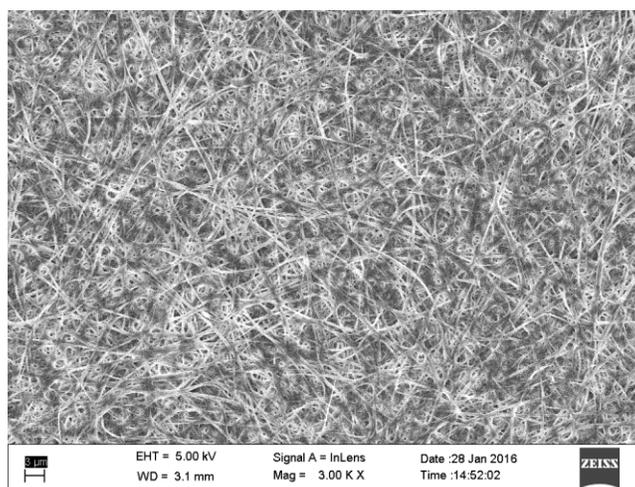


Figure S28.FESEM image of xerogel of **3a** at 1% (w/v) concentration in chlorobenzene

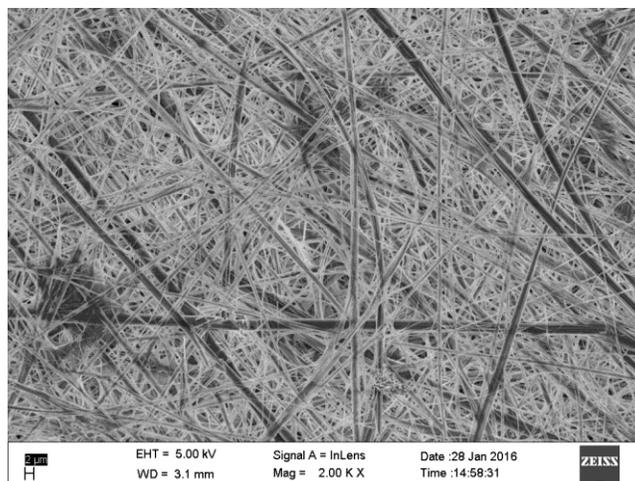


Figure S29.FESEM image of xerogel of **3a** at 1% (w/v) concentration in ethanol

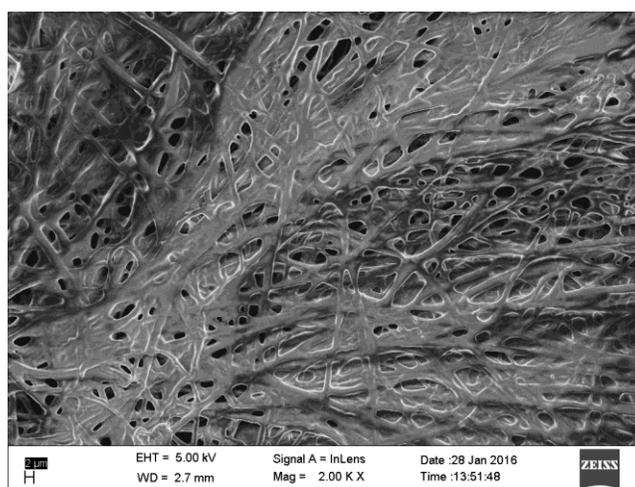


Figure S30.FESEM image of xerogel of **3a** at 1% (w/v) concentration in petrol

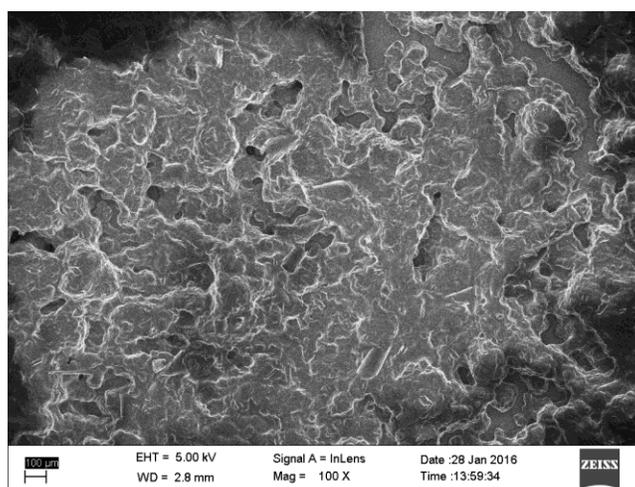


Figure S31.FESEM image of xerogel of **3a** at 1% (w/v) concentration in diesel

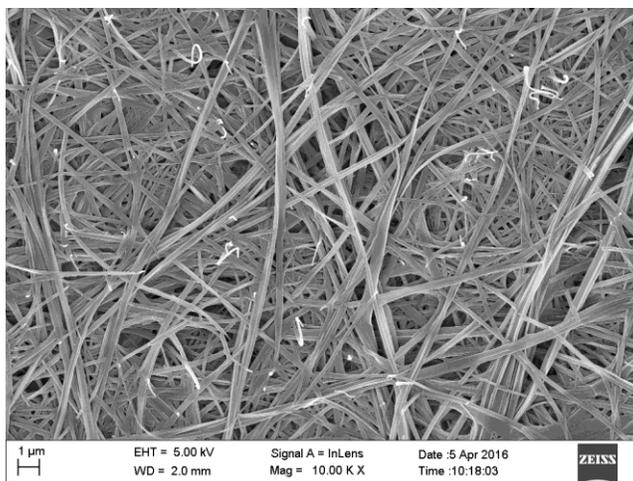


Figure S32.FESEM image of xerogel of **3g** at 1% (w/v) concentration in benzene

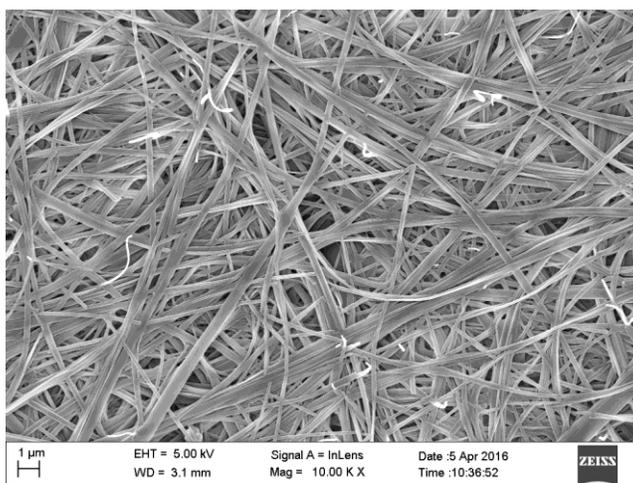


Figure S33.FESEM image of xerogel of **3g** at 1% (w/v) concentration in toluene

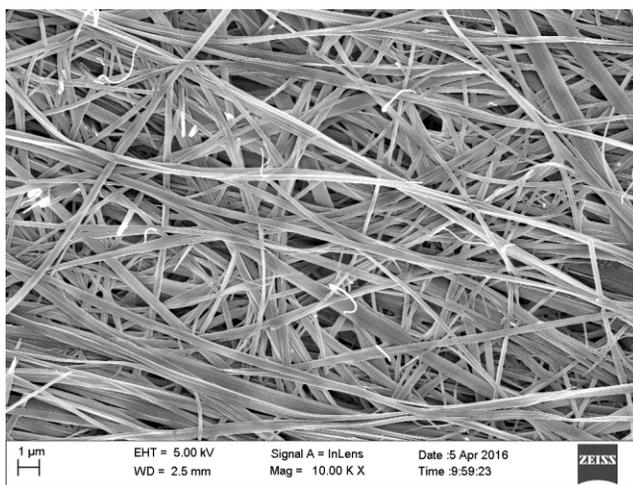


Figure S34.FESEM image of xerogel of **3g** at 1% (w/v) concentration in *o*-xylene

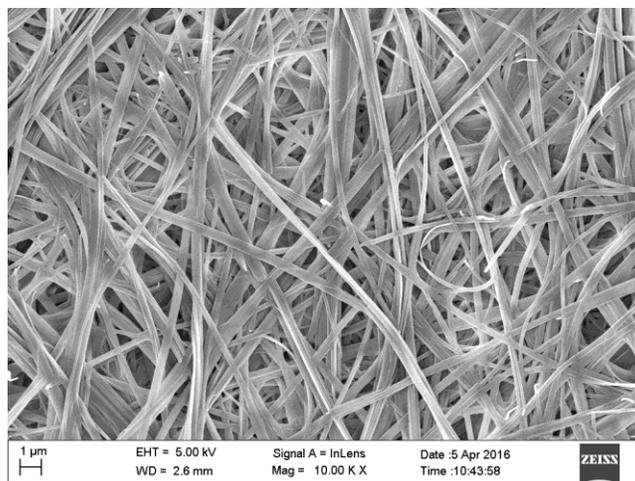


Figure S35.FESEM image of xerogel of **3g** at 1% (w/v) concentration in *m*-xylene

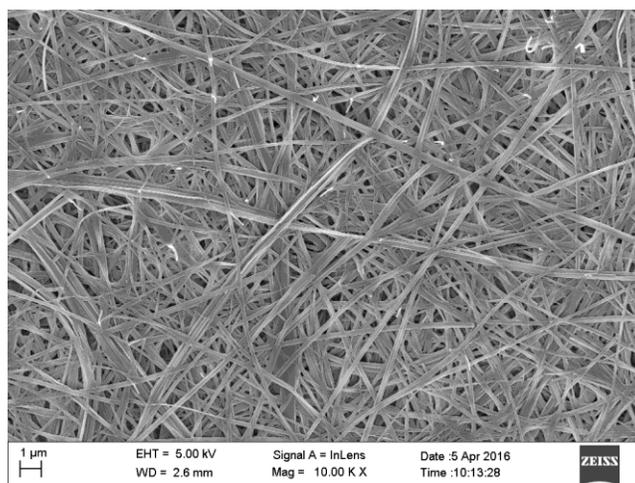


Figure S36.FESEM image of xerogel of **3g** at 1% (w/v) concentration in *p*-xylene

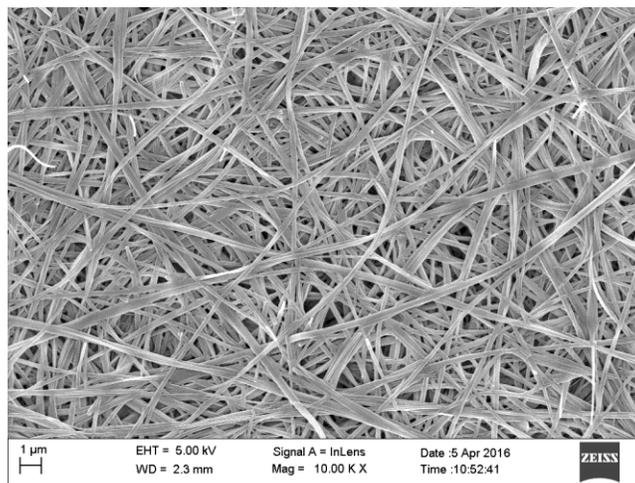


Figure S37.FESEM image of xerogel of **3g** at 1% (w/v) concentration in chlorobenzene

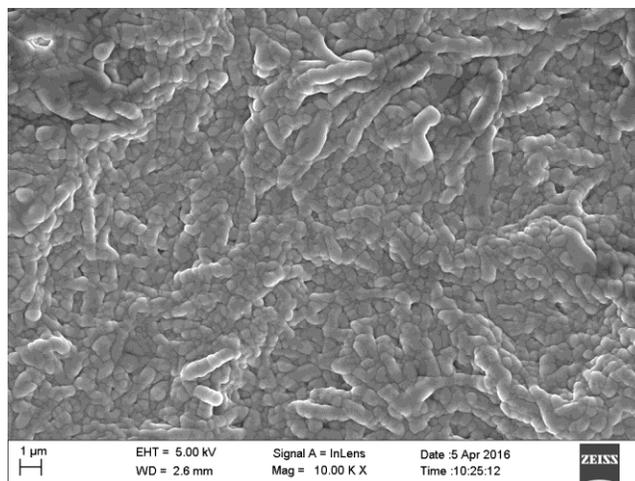


Figure S38.FESEM image of xerogel of 3g at 1% (w/v) concentration petrol

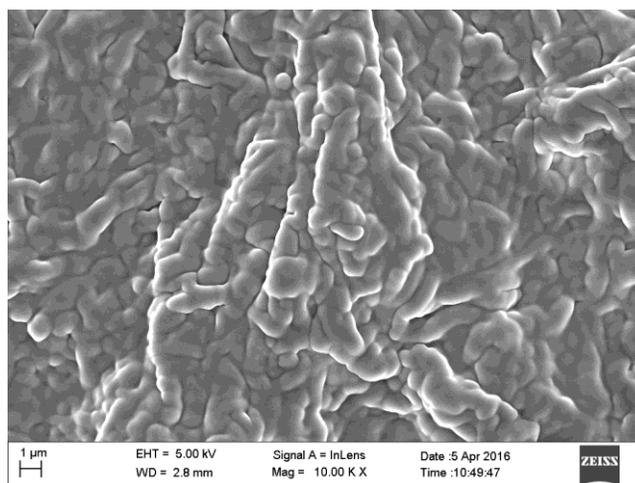


Figure S39.FESEM image of xerogel of 3g at 1% (w/v) concentration diesel

5.5 AFM images

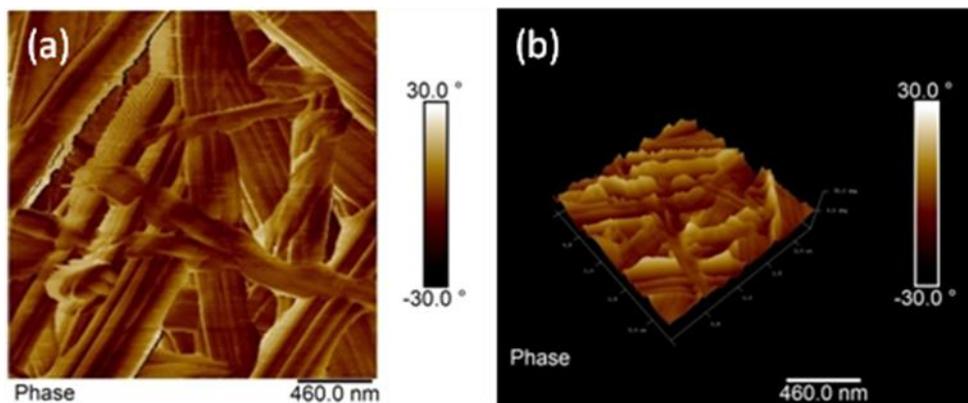


Figure S40.AFM image of **3a** in *m*-xylene (a) 2-D image (b) 3-D image

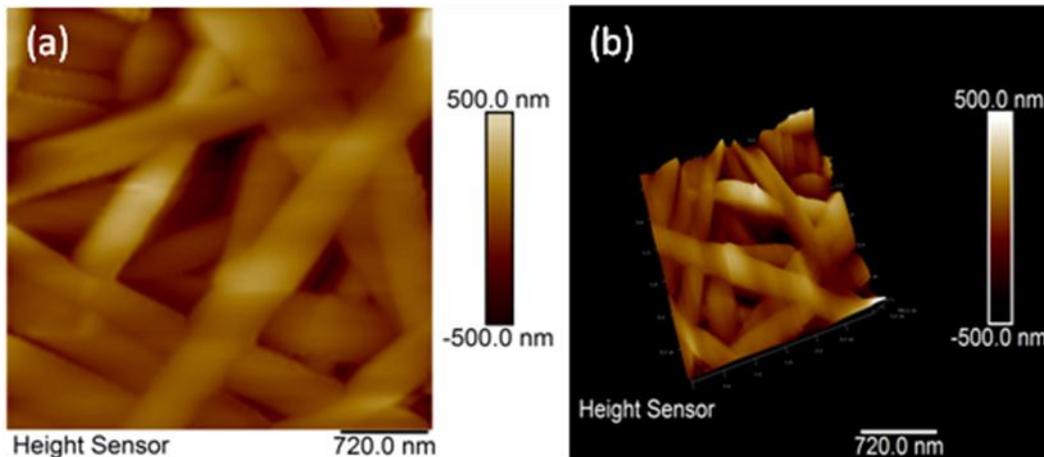


Figure S41. AFM image of **3g** in *m*-xylene (a) 2-D image (b) 3-D image

5.6 Rheology

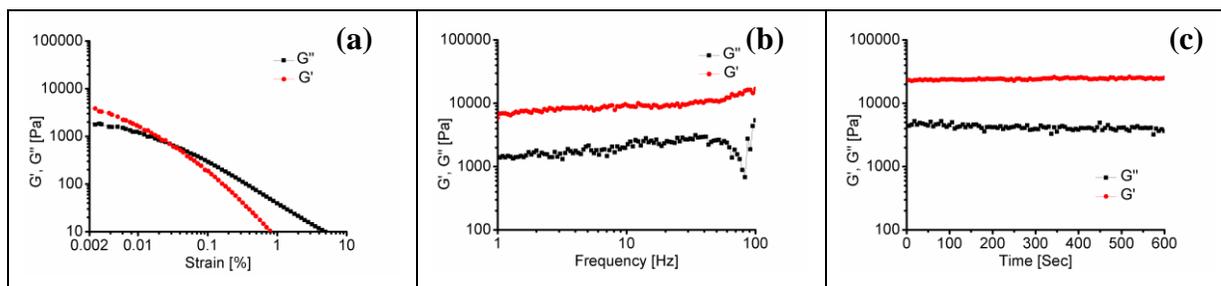


Figure S42. (a) DSS cruve of **3a** gel with benzene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with benzene at 1% (w/v) at strain 0.001% and temperature 25 °C (c) DTS curve of **3a** gel with benzene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

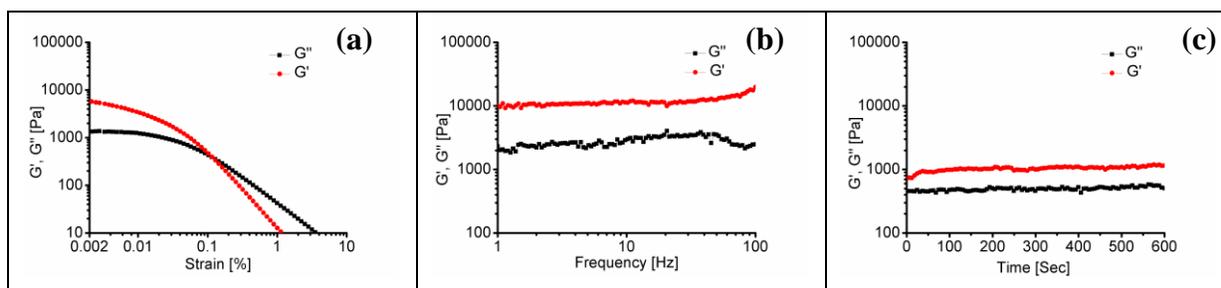


Figure S43. (a)DSS cruve of **3a** gel with toluene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with toluene at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3a** gel with toluene at 1% (w/v) at frequency 1 Hz and temperature 25°C

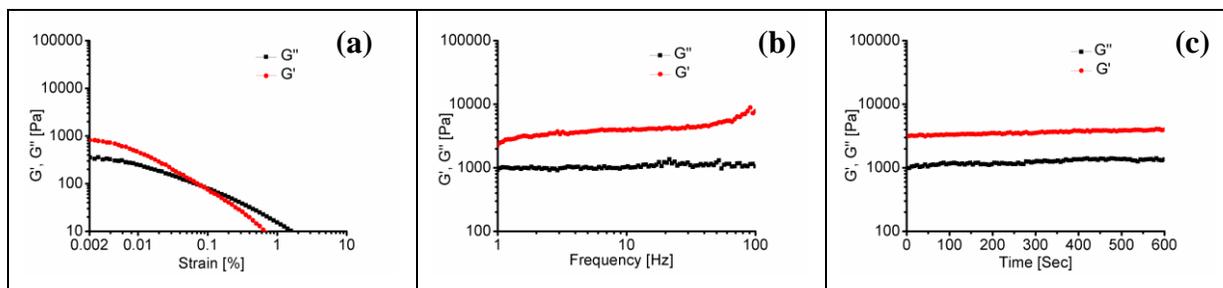


Figure S44. (a)DSS cruve of **3a** gel with *o*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with *o*-xylene at 1% (w/v) at strain 0.001% and temperature 25 °C (c) DTS curve of **3a** gel with *o*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

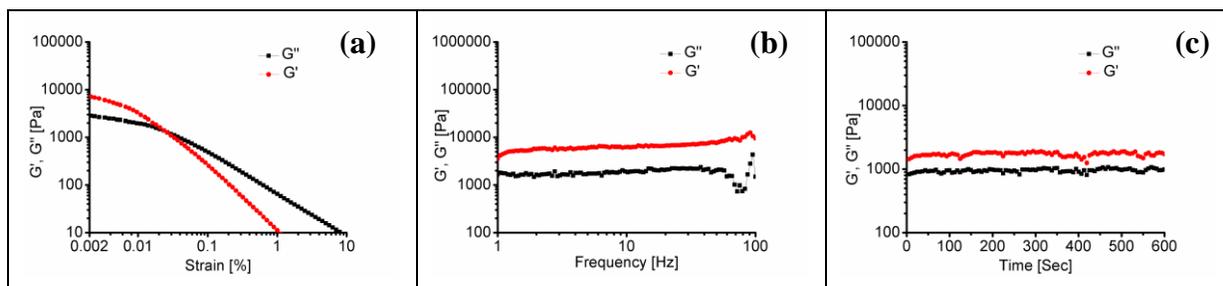


Figure S45. (a)DSS cruve of **3a** gel with *m*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with *m*-xylene at 1% (w/v) at strain 0.002% and temperature 25 °C (c)DTS curve of **3a** gel with *m*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

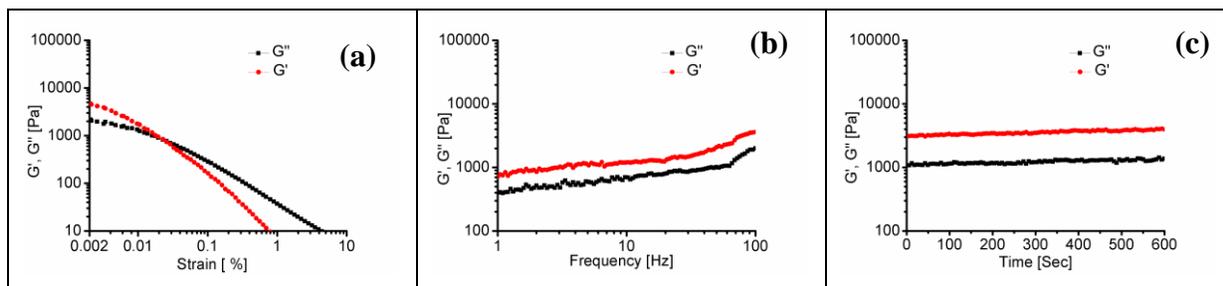


Figure S46. (a)DSS cruve of **3a** gel with *p*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with *p*-xylene at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3a** gel with *p*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

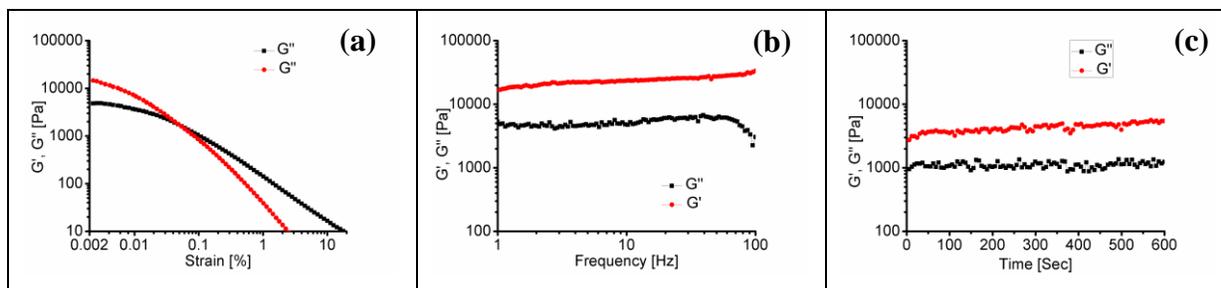


Figure S47. (a)DSS cruve of **3a** gel with Chloro-benzene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with Chloro-benzene at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3a** gel with Chloro-benzene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

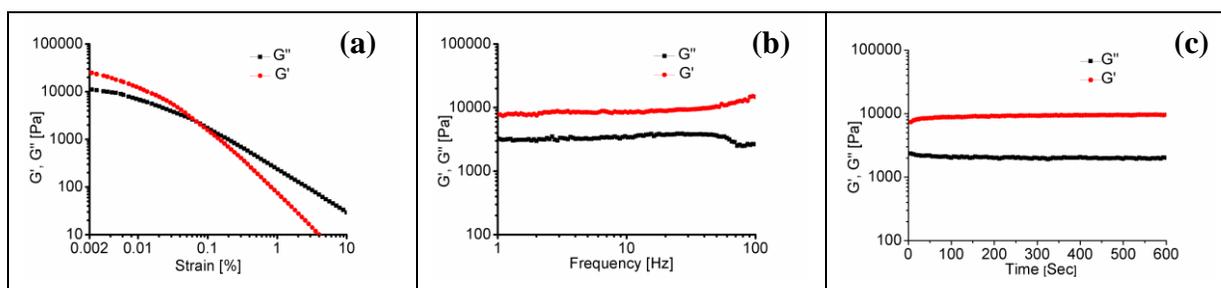


Figure S48. (a) DSS cruve of **3a** gel with Ethanol at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with Ethanol at 1% (w/v) at strain 0.003% and temperature 25 °C (c)DTS curve of **3a** gel with Ethanol at 1% (w/v) at frequency 1 Hz and temperature 25°C.

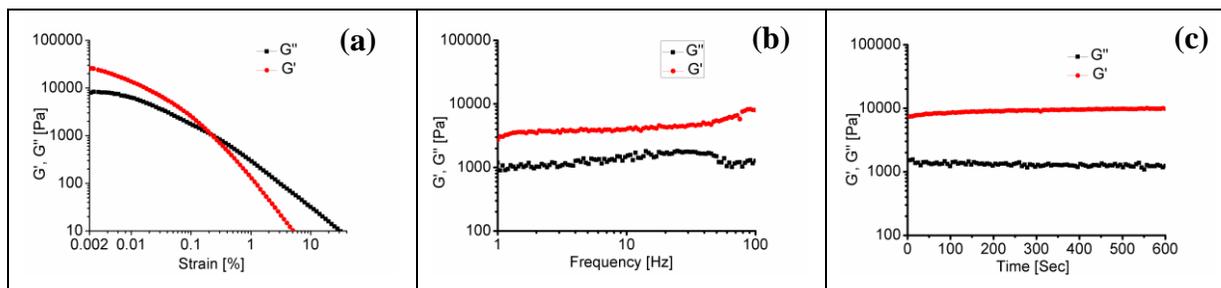


Figure S49. (a)DSS cruve of **3a** gel with Petrol at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with Petrol at 1% (w/v) at strain 0.002% and temperature 25 °C (c)DTS curve of **3a** gel with Petrol at 1% (w/v) at frequency 1 Hz and temperature 25°C

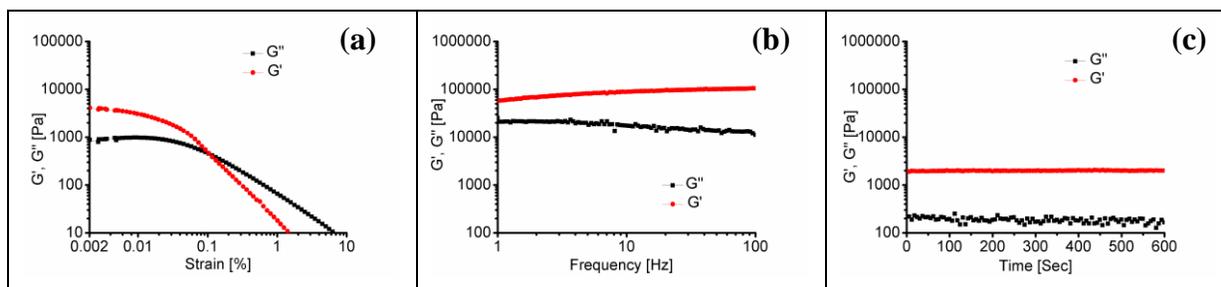


Figure S50. (a)DSS cruve of **3a** gel with Diesel at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with Diesel at 1% (w/v) at strain 0.002% and temperature 25 °C (c)DTS curve of **3a** gel with Diesel at 1% (w/v) at frequency 1 Hz and temperature 25°C

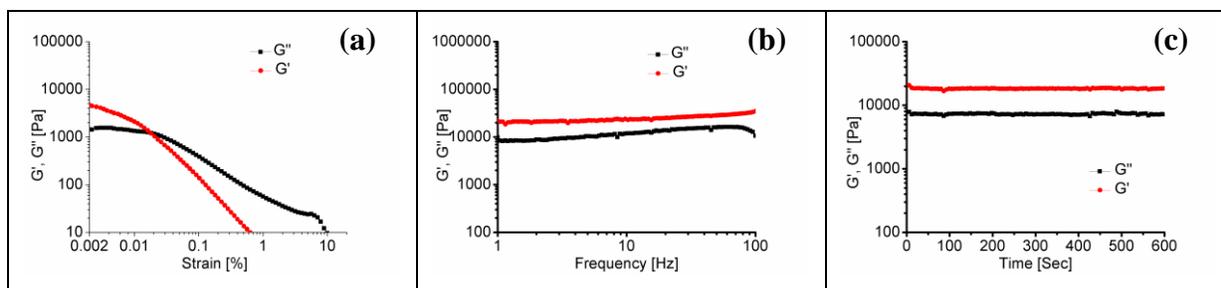


Figure S51. (a)DSS cruve of **3a** gel with Crude oil at 2% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3a** gel with Crude oil at 1% (w/v) at strain 0.002% and temperature 25 °C (c)DTS curve of **3a** gel with Crude oil at 1% (w/v) at frequency 1 Hz and temperature 25°C.

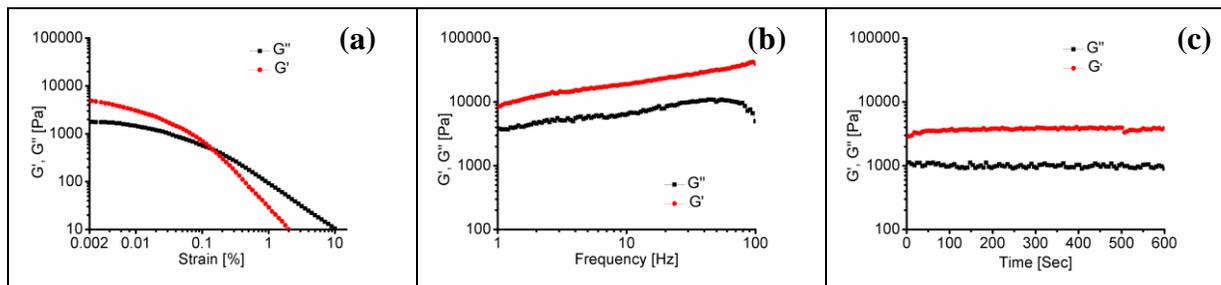


Figure S52. (a)DSS cruve of **3g** gel with benzene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with benzene at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3g** gel with benzene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

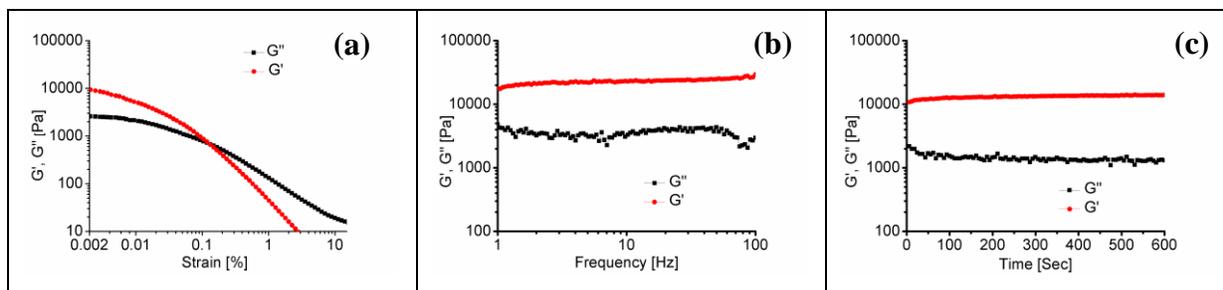


Figure S53. (a)DSS cruve of **3g** gel with toluene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with toluene at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3g** gel with toluene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

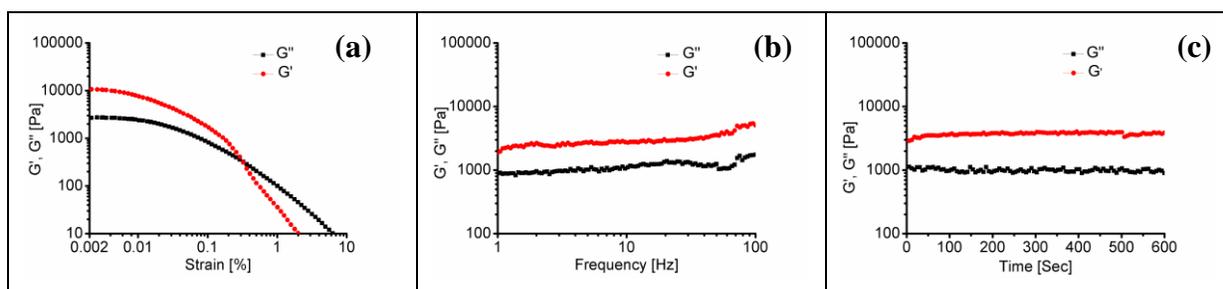


Figure S54. (a)DSS cruve of **3g** gel with *o*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with *o*-xylene at 1% (w/v) at strain 0.002% and temperature 25 °C (c)DTS curve of **3g** gel with *o*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

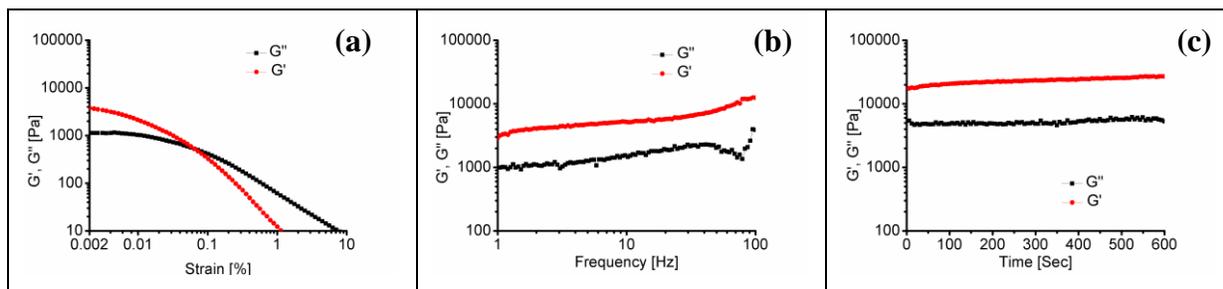


Figure S55. (a)DSS cruve of **3g** gel with *m*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with *m*-xylene at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3g** gel with *m*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

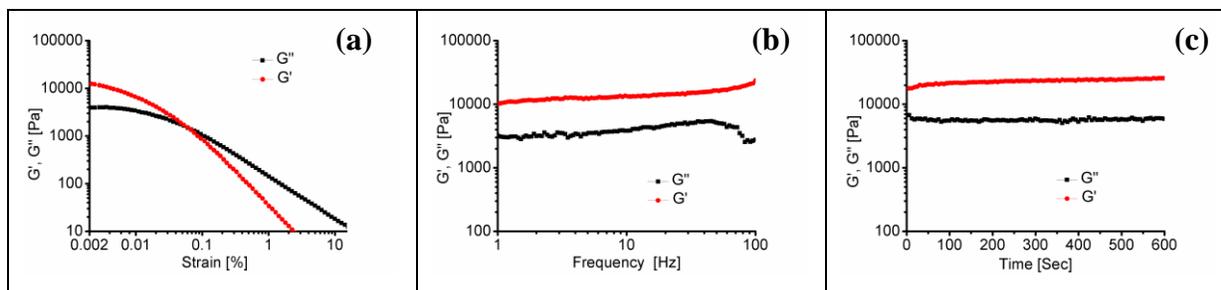


Figure S56. (a)DSS cruve of **3g** gel with *p*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with *p*-xylene at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3g** gel with *p*-xylene at 1% (w/v) at frequency 1 Hz and temperature 25 °C.

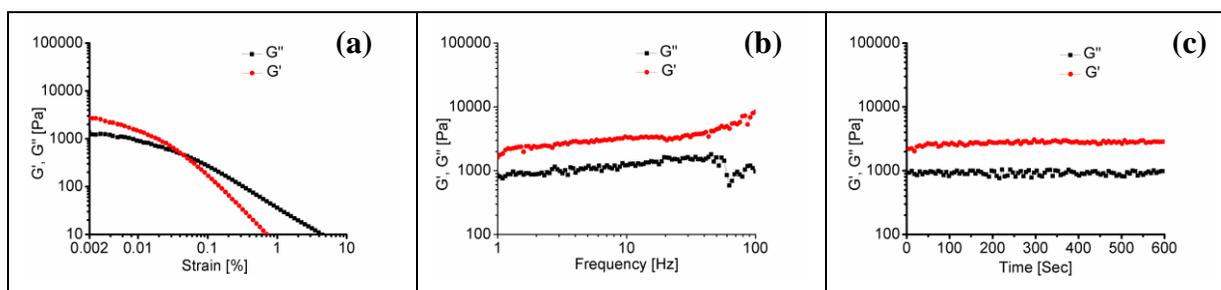


Figure S57. (a)DSS cruve of **3g** gel with chlorobenzene at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with chlorobenzene at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3g** gel with chlorobenzene at 1% (w/v) at frequency 1 Hz and temperature 25°C.

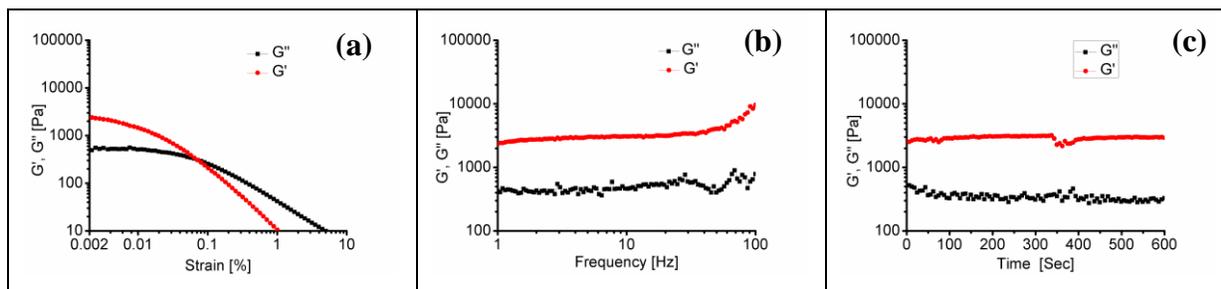


Figure S58. (a)DSS cruve of **3g** gel with petrol at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with petrol at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3g** gel with petrol at 1% (w/v) at frequency 1 Hz and temperature 25°C.

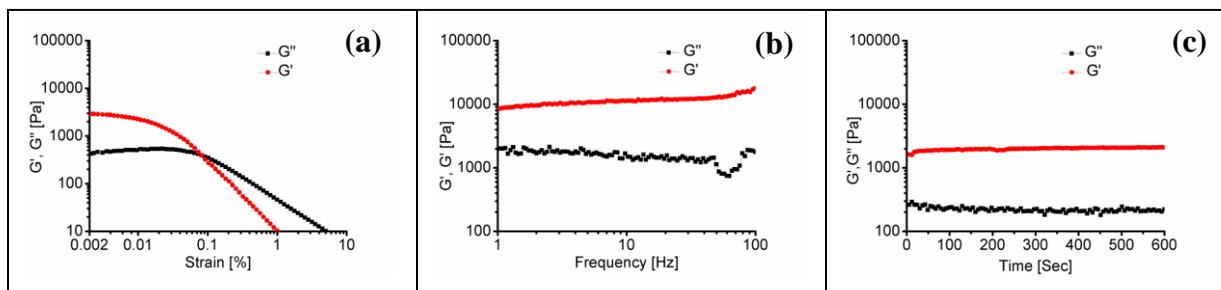


Figure S59. (a)DSS cruve of **3g** gel with diesel at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with diesel at 1% (w/v) at strain 0.002% and temperature 25 °C (c)DTS curve of **3g** gel with diesel at 1% (w/v) at frequency 1 Hz and temperature 25 °C.

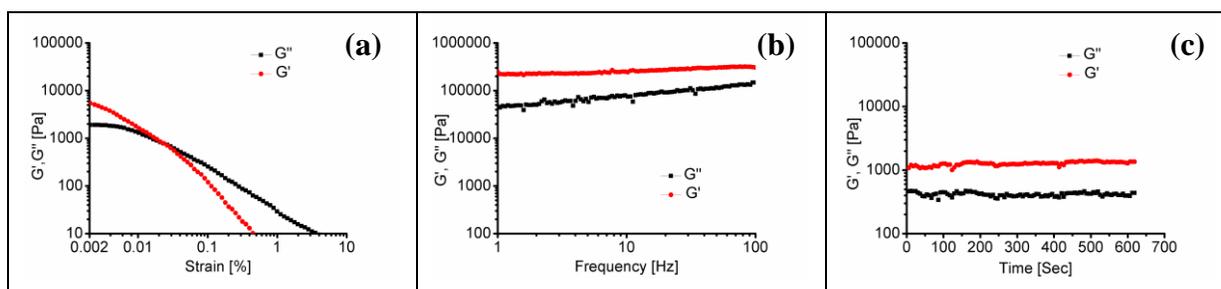


Figure S60. (a)DSS cruve of **3g** gel with crude oil at 1% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS cruve of **3g** gel with crude oil at 1% (w/v) at strain 0.001% and temperature 25 °C (c)DTS curve of **3g** gel with crude oil at 1% (w/v) at frequency 1 Hz and temperature 25 °C.

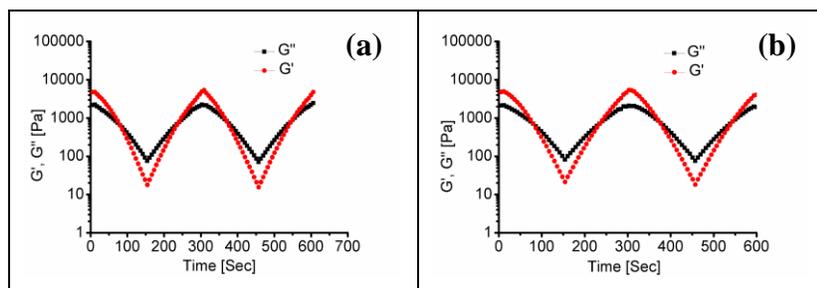


Figure S61. Curves for thixotropic experiment for the meta-xylene gel at 1% (w/v) concentration for (a) **3a** and (b) **3g**.

5.7 PSOG of petrol, diesel and crude-oil

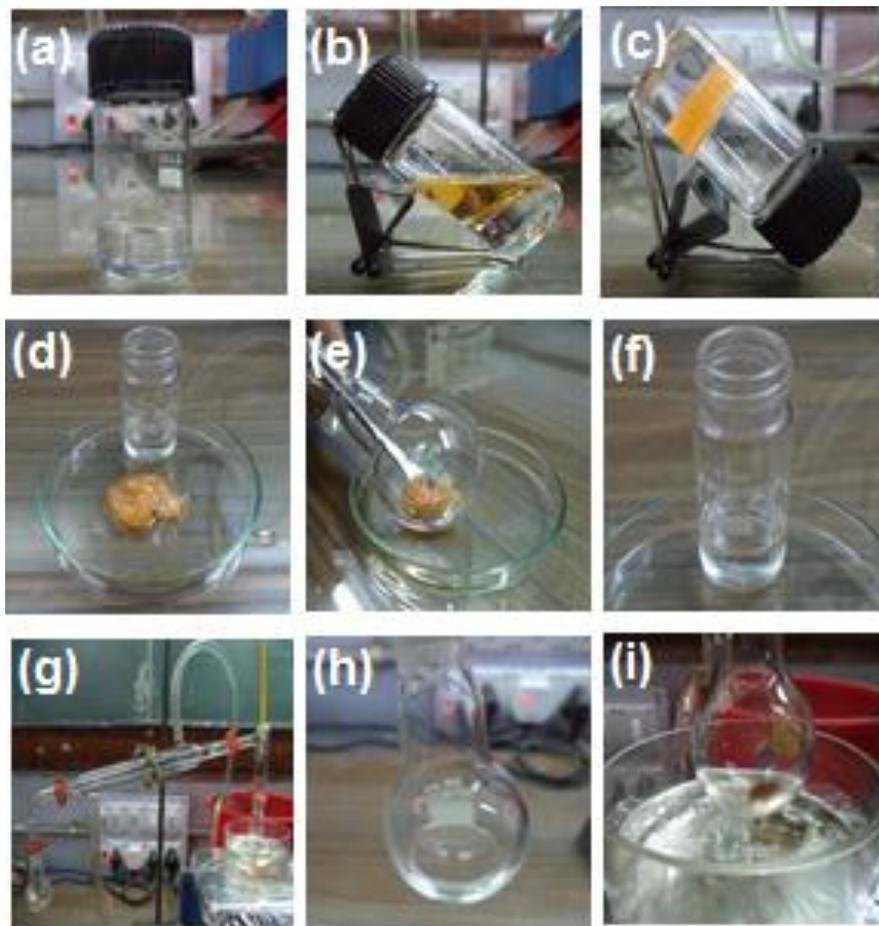


Figure S62. PSOG of petrol and recovery of congealed petrol using gelator **3a**. (a) Water (b) Biphasic mixture of petrol and water (c) congealed petrol layer (d) separated congealed petrol layer (e) transfer of congealed petrol into a flask (f) residual water after removal of congealed petrol (g) distillation set-up for recovery of petrol (h) petrol distillate (i) residual organogelator.

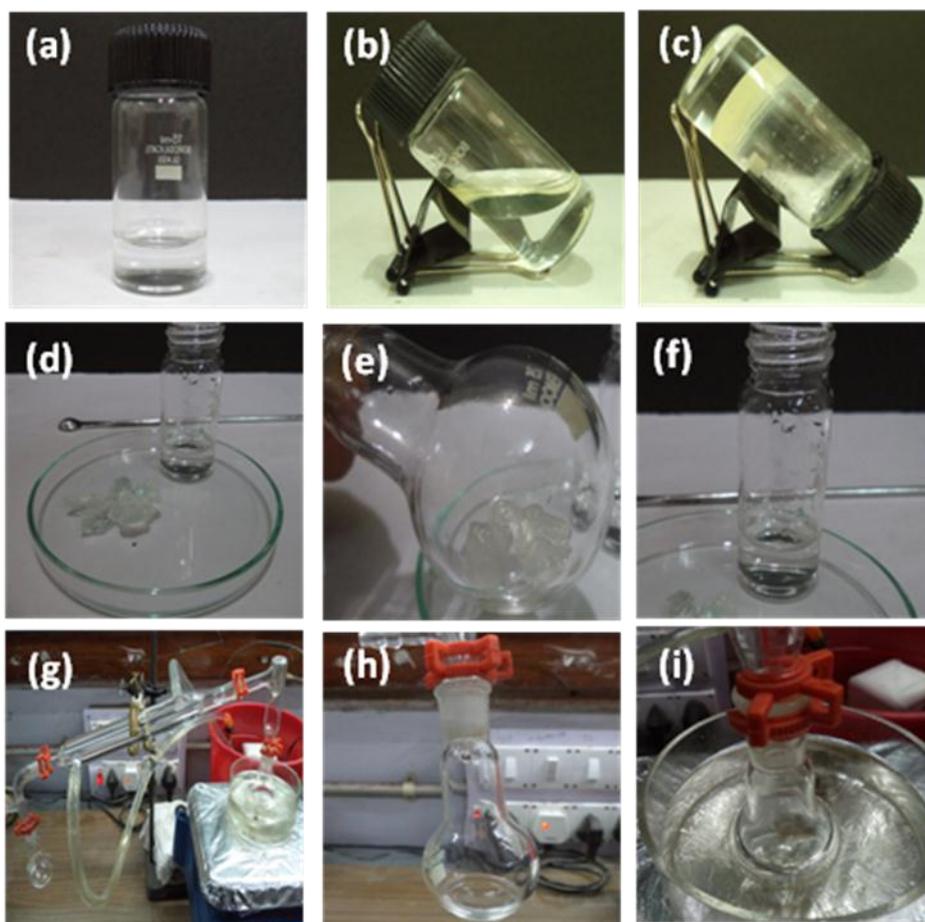


Figure S63. Phase selective gelation of diesel using **3a** in diesel (a) 4 ml of water. (b) Biphasic mixture of water and diesel (c) Congealed diesel layer (d) separated congealed diesel layer (e) transfer of congealed diesel gel into a flask (f) residue water after removal of congealed diesel (g) distillation set-up for recovery of diesel (h) diesel distillate (i) residual organogelator.

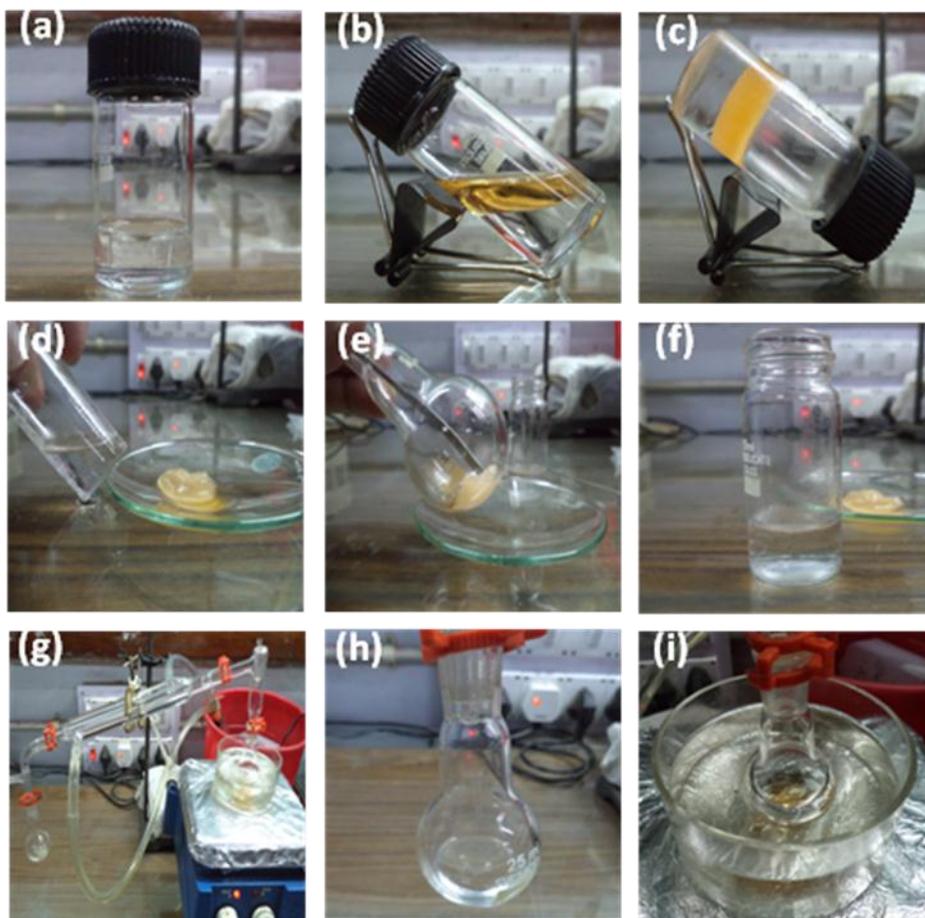


Figure S64. Phase selective gelation of petrol using **3g** in petrol (a) 4 ml of water. (b) Biphasic mixture of water and diesel (c) Congealed petrol layer (d) separated congealed petrol layer (e) transfer of congealed petrol gel into a flask (f) residue water after removal of congealed petrol (g) distillation set-up for recovery of petrol (h) petrol distillate (i) residual organogelator.

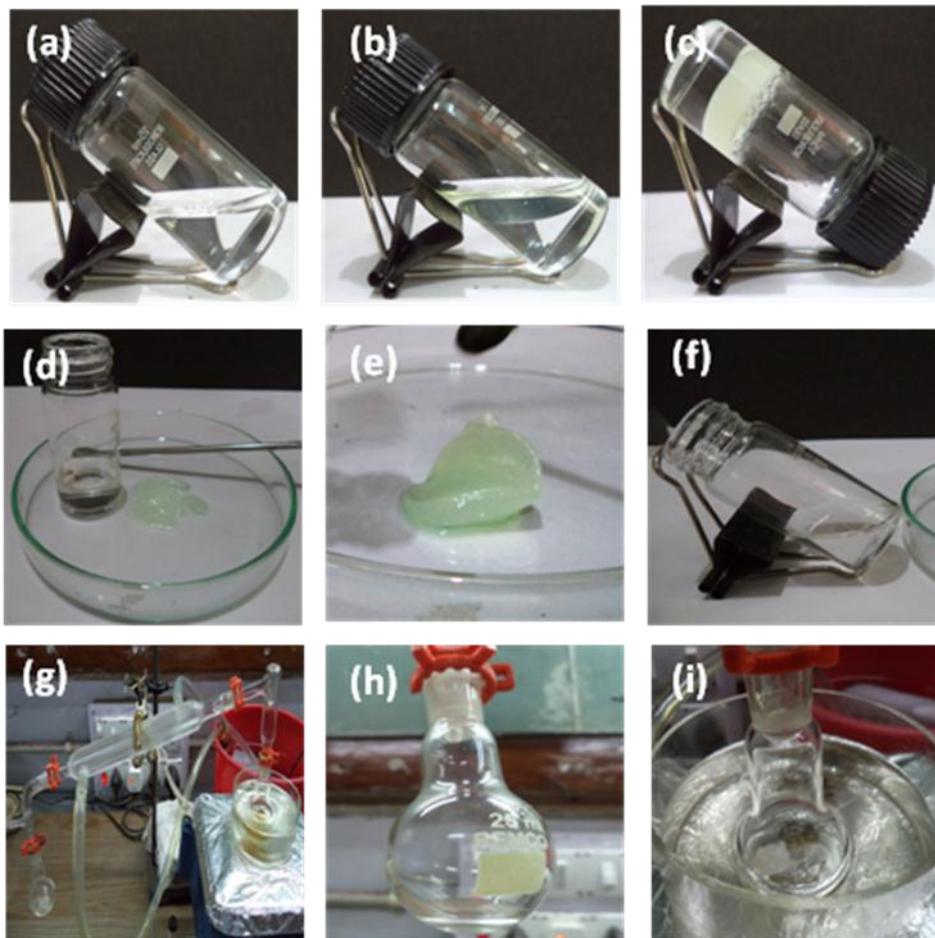


Figure S65. Phase selective gelation of diesel using **3g** in diesel (a) 4 ml of water. (b) Biphasic mixture of water and diesel. (c) Congealed diesel layer (d) separated congealed diesel layer (e) transfer of congealed diesel gel into a dish. (f) residue water after removal of congealed diesel (g) distillation set-up for recovery of diesel. (h) diesel distillate (i) residual organogelator.

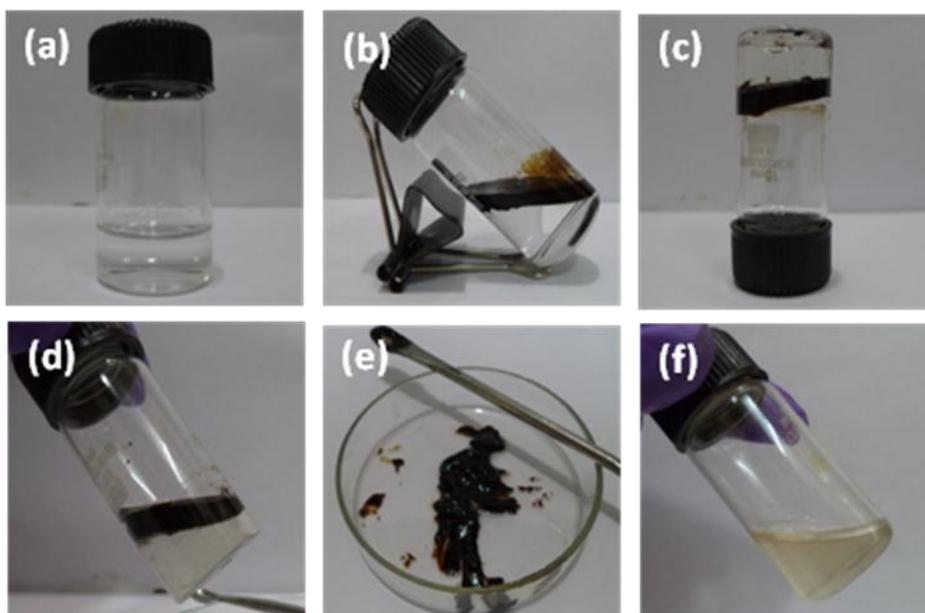


Figure S66. Phase selective gelation of crude oil using **3g** (a) Water (b) Biphasic mixture of water and crude-oil (c) congealed crude-oil layer after addition of gelator (d) floating congealed crude-oil layer (e) removed congealed crude-oil (f) residual water

6 Spectra of 3a-3g

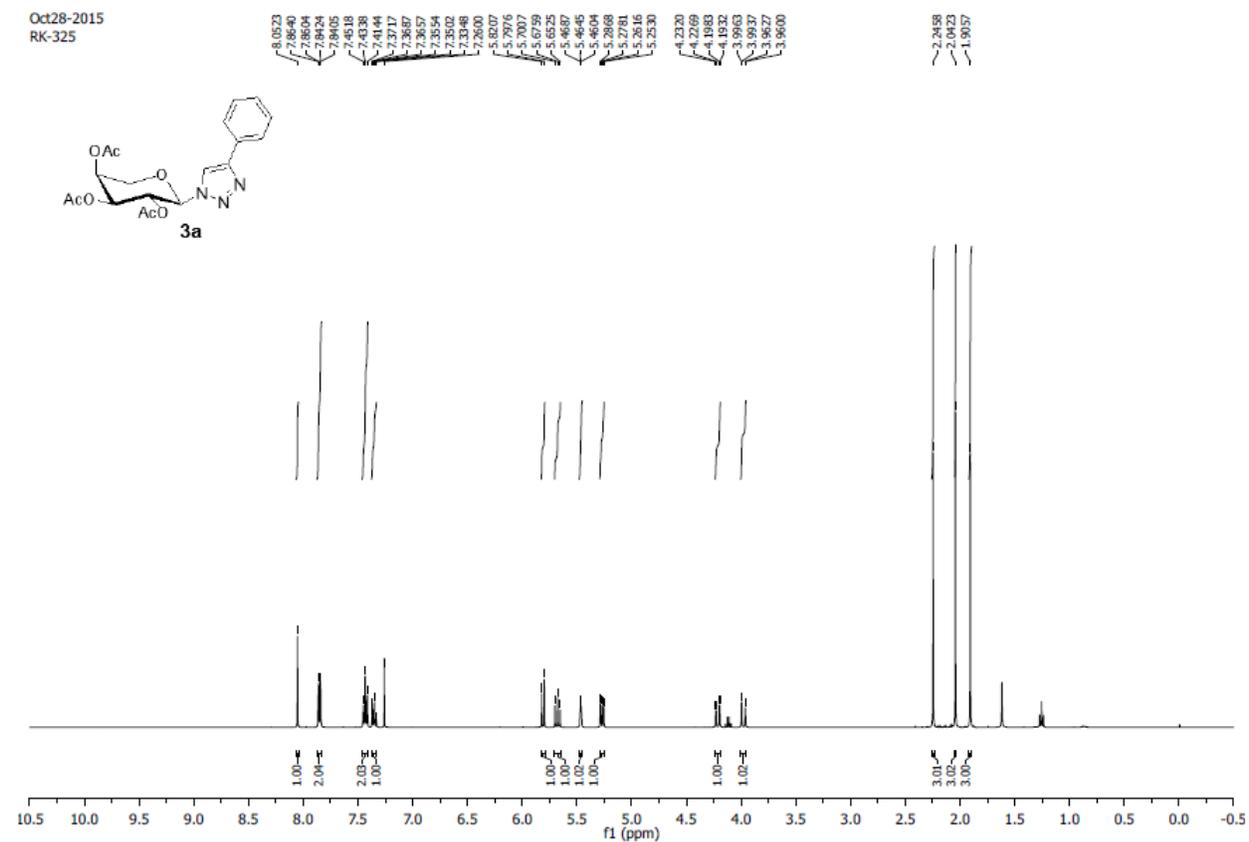


Figure S67. ^1H NMR spectra of **3a** in CDCl_3 .

Oct28-2015
RK-325

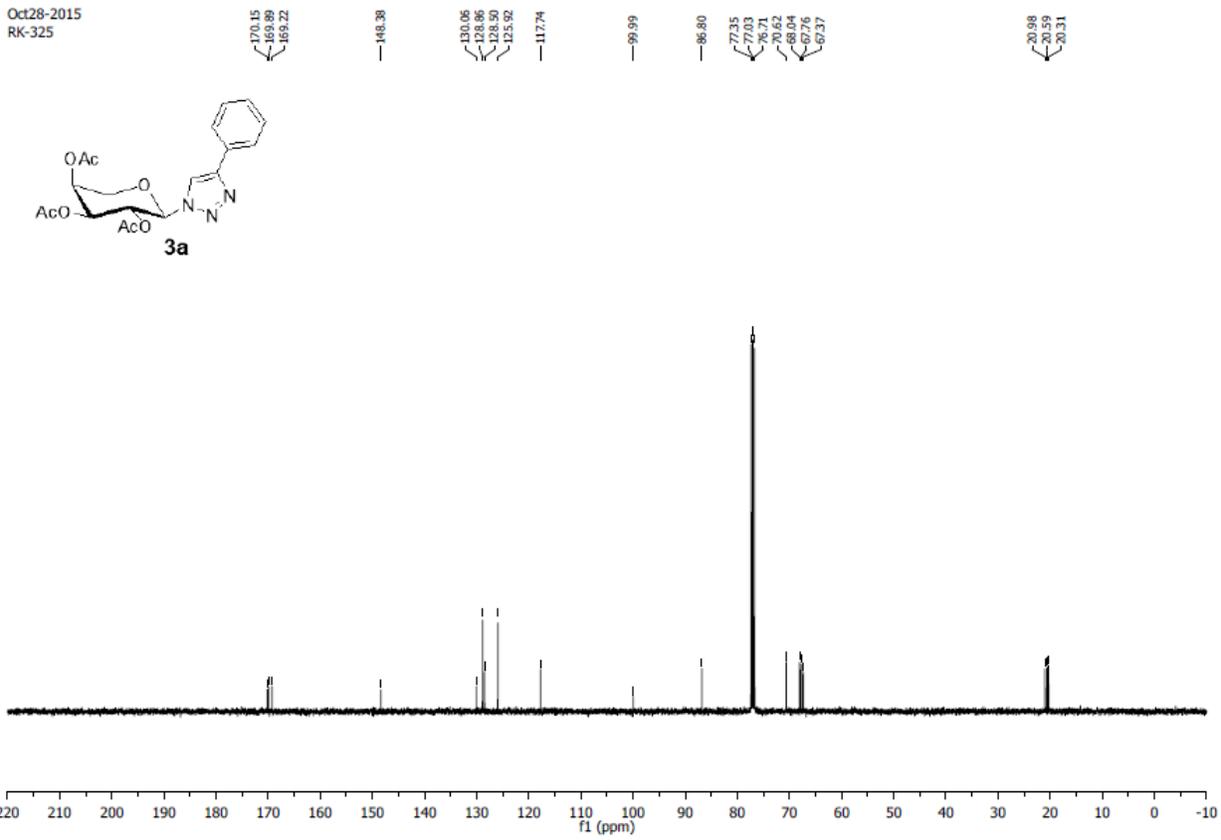


Figure S68. ¹³C NMR spectra of **3a** in CDCl₃.

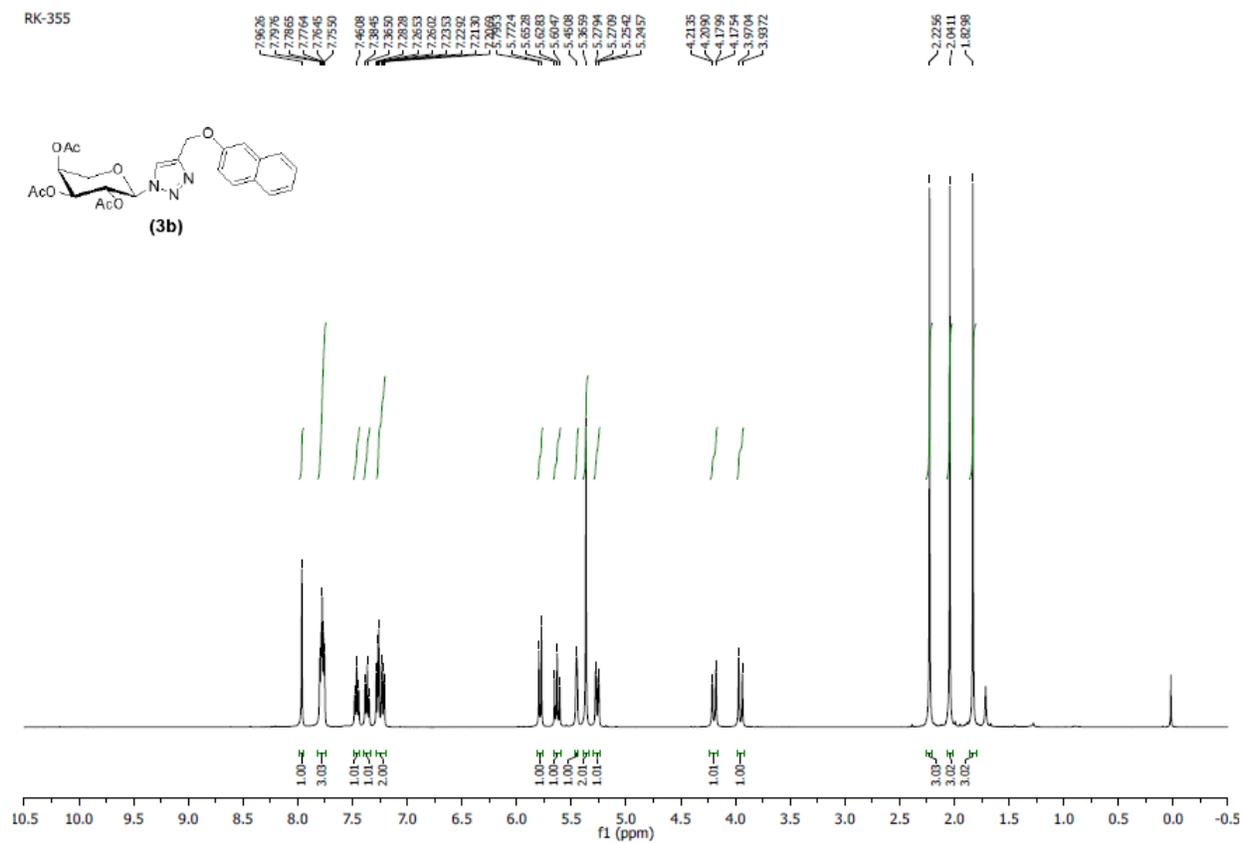


Figure S69. ^1H NMR spectra of **3b** in CDCl_3 .

FID FILES (NAVENDU)
RK-355

170.08
169.81
169.02

156.00

144.83

134.35
133.16
129.17
127.57
126.89
126.39
123.86
121.09
118.81

107.24

99.93

86.60

77.32
77.00
76.68
70.46
69.04
67.63
67.24
61.92

20.89
20.51
20.10

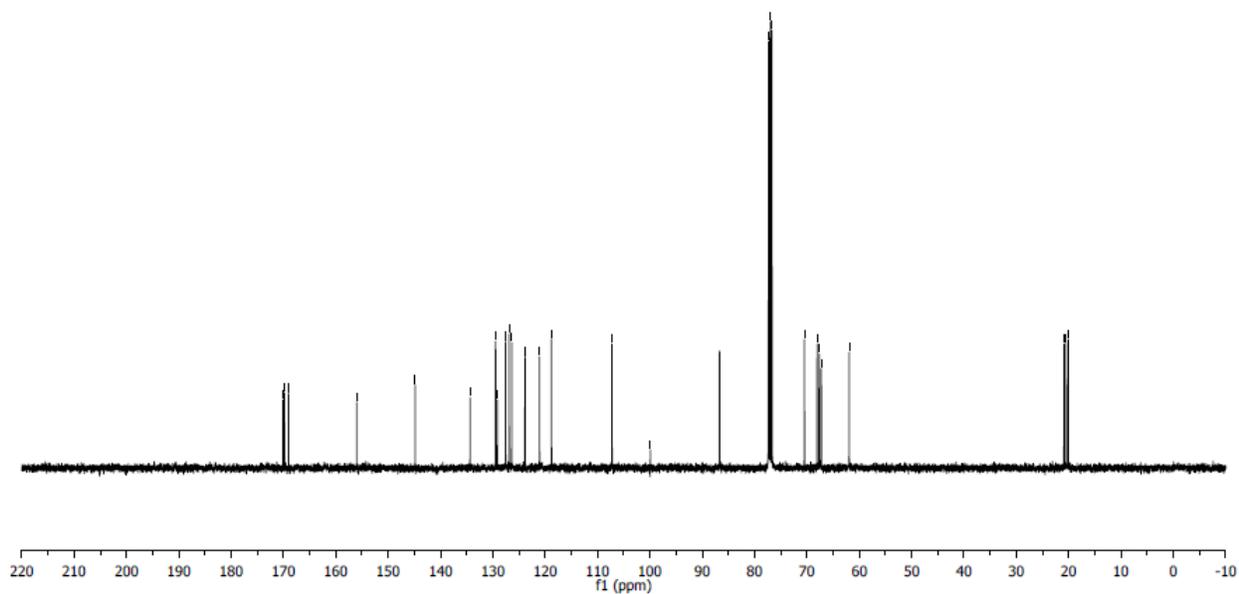
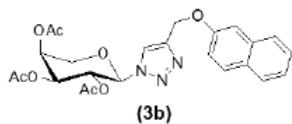


Figure S70. ¹³C NMR spectra of **3b** in CDCl₃.

Jan11-2016
RK-340

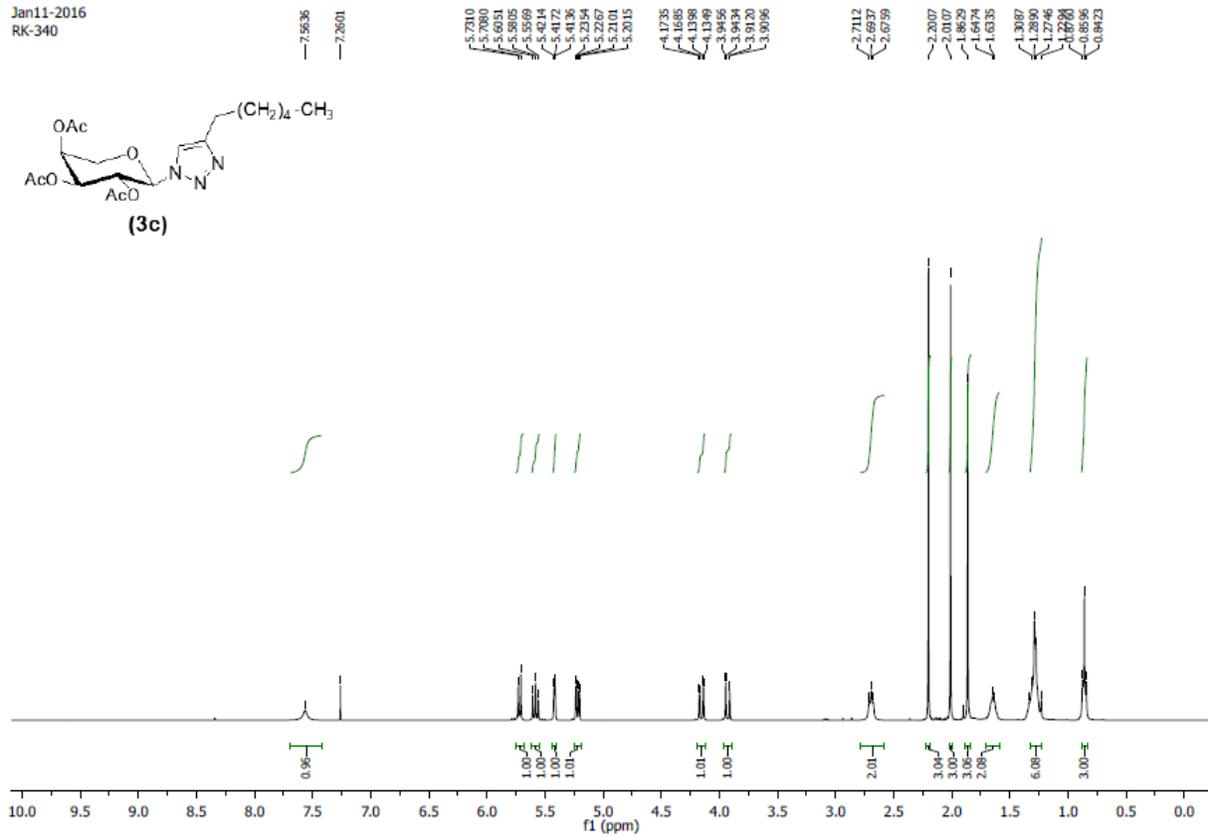


Figure S71. ¹H NMR spectra of **3c** in CDCl₃.

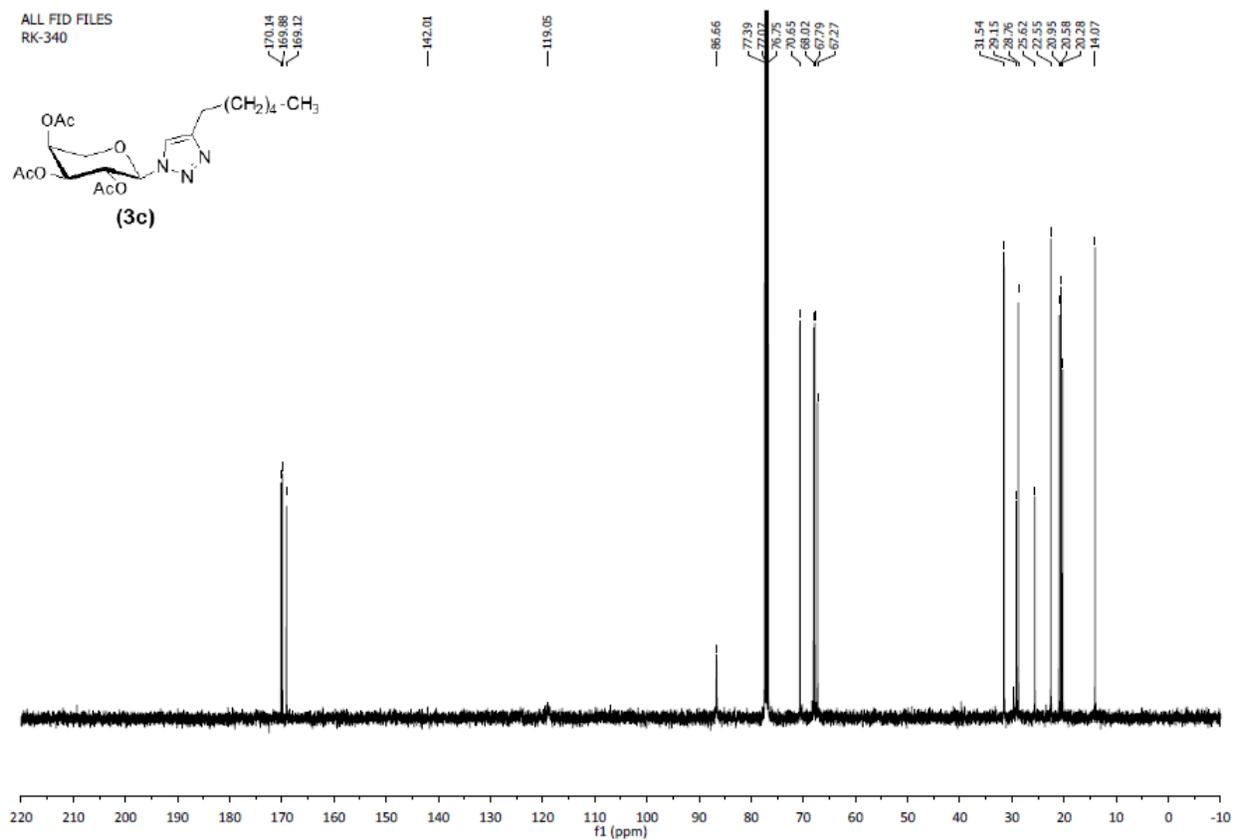


Figure S72. ¹³C NMR spectra of **3c** in CDCl₃.

Jan11-2016
RK-338

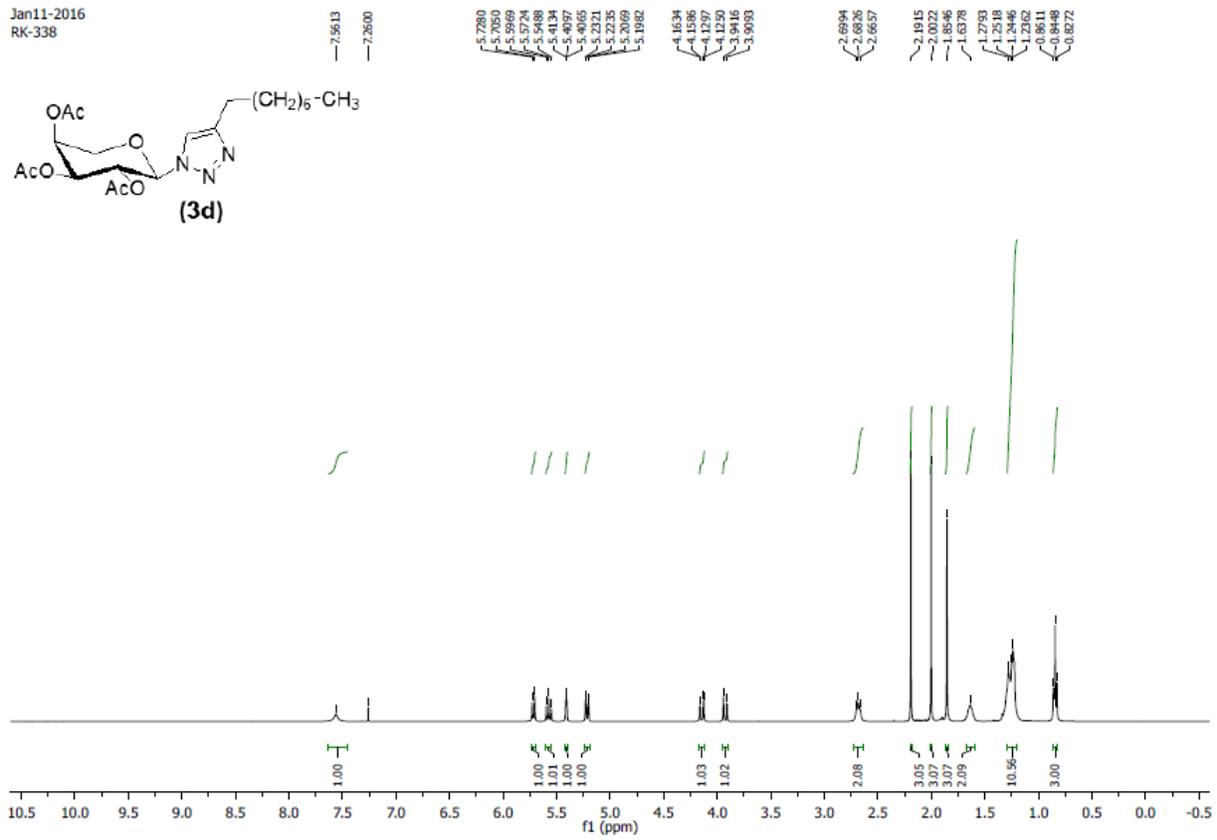


Figure S73. ¹H NMR spectra of **3d** in CDCl₃.

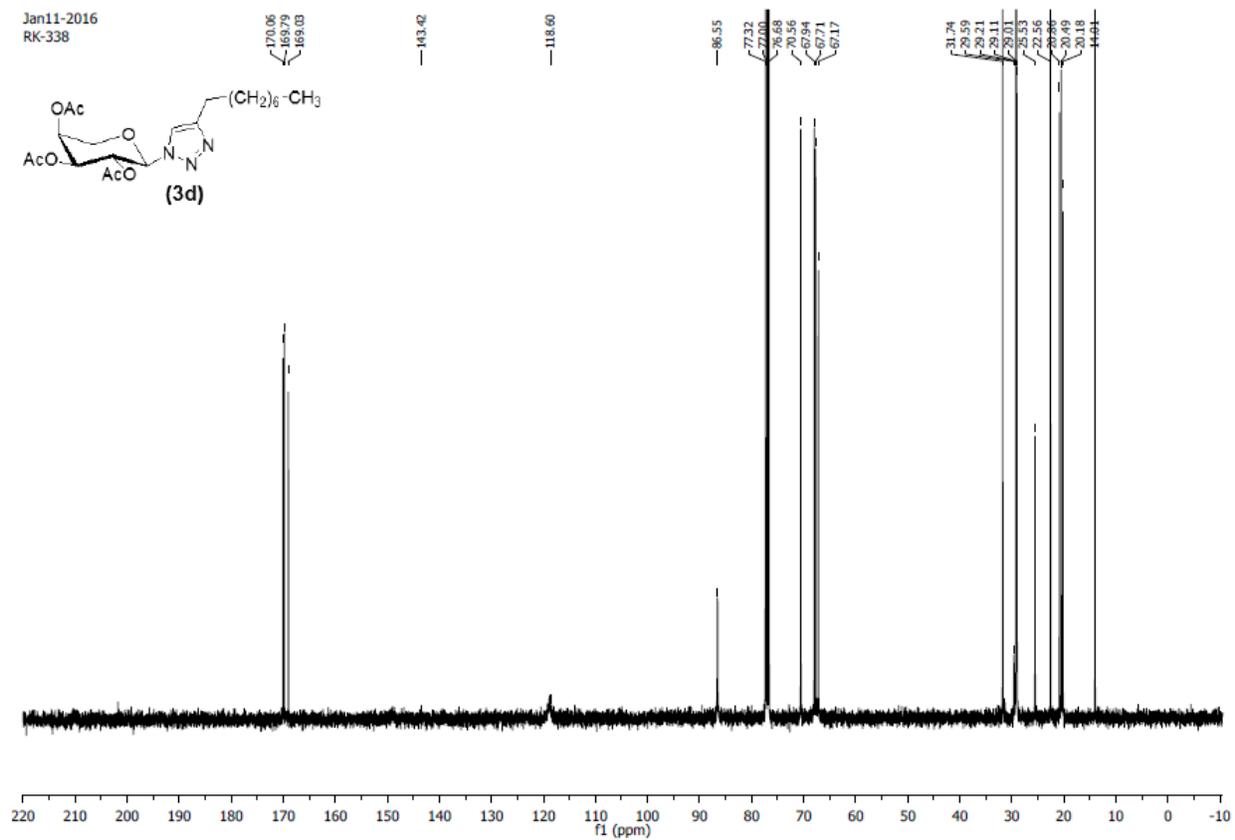


Figure S74. ^{13}C NMR spectra of **3d** in CDCl_3 .

Jan11-2016
RK-339

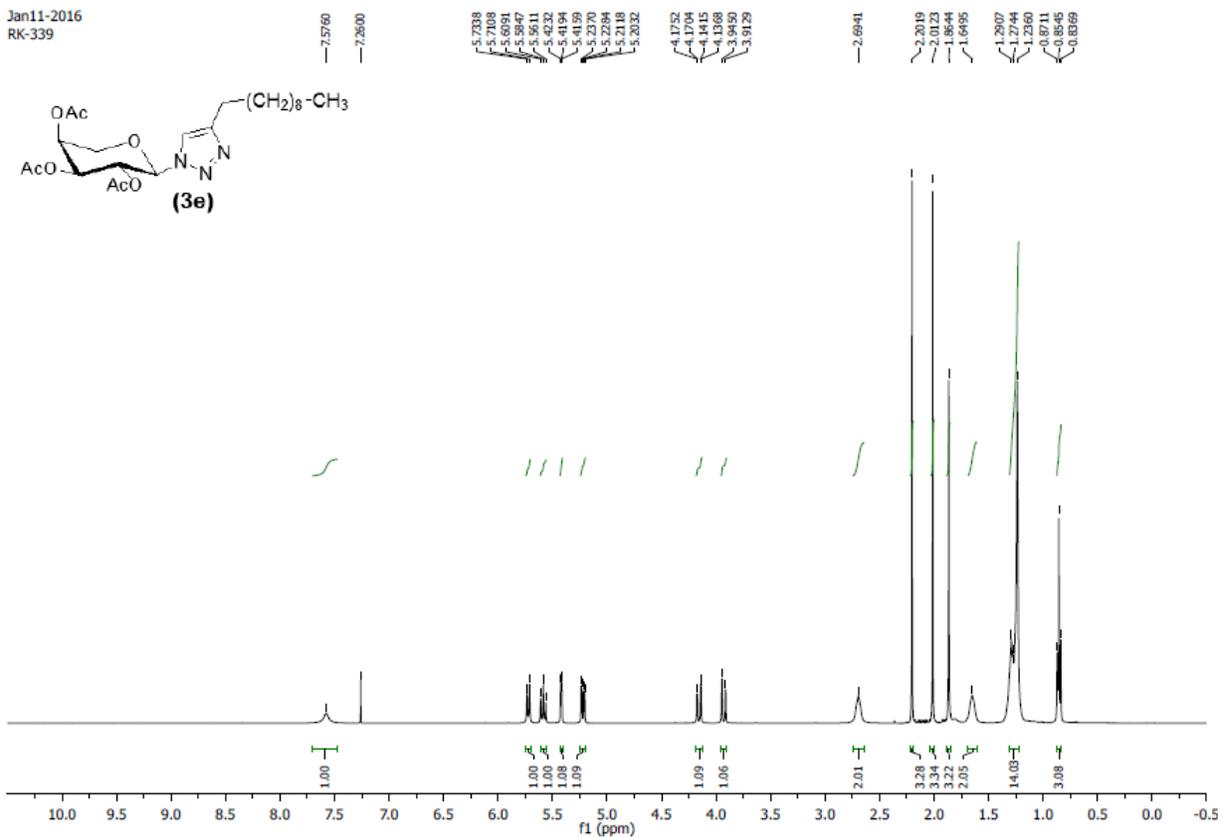


Figure S75. ¹H NMR spectra of **3e** in CDCl₃.

Jan11-2016
RK-339

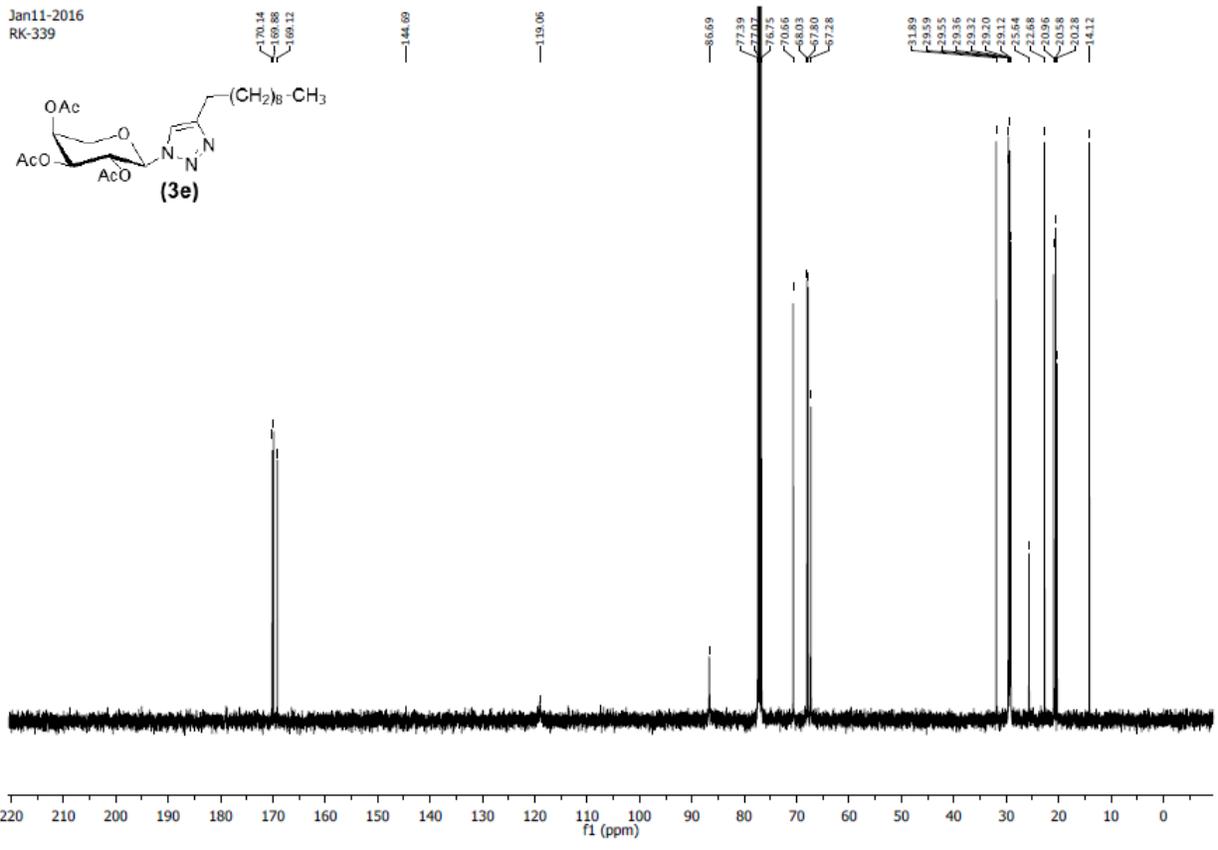


Figure S76. ¹³C NMR spectra of **3e** in CDCl₃.

Dec08-2015
RK-333

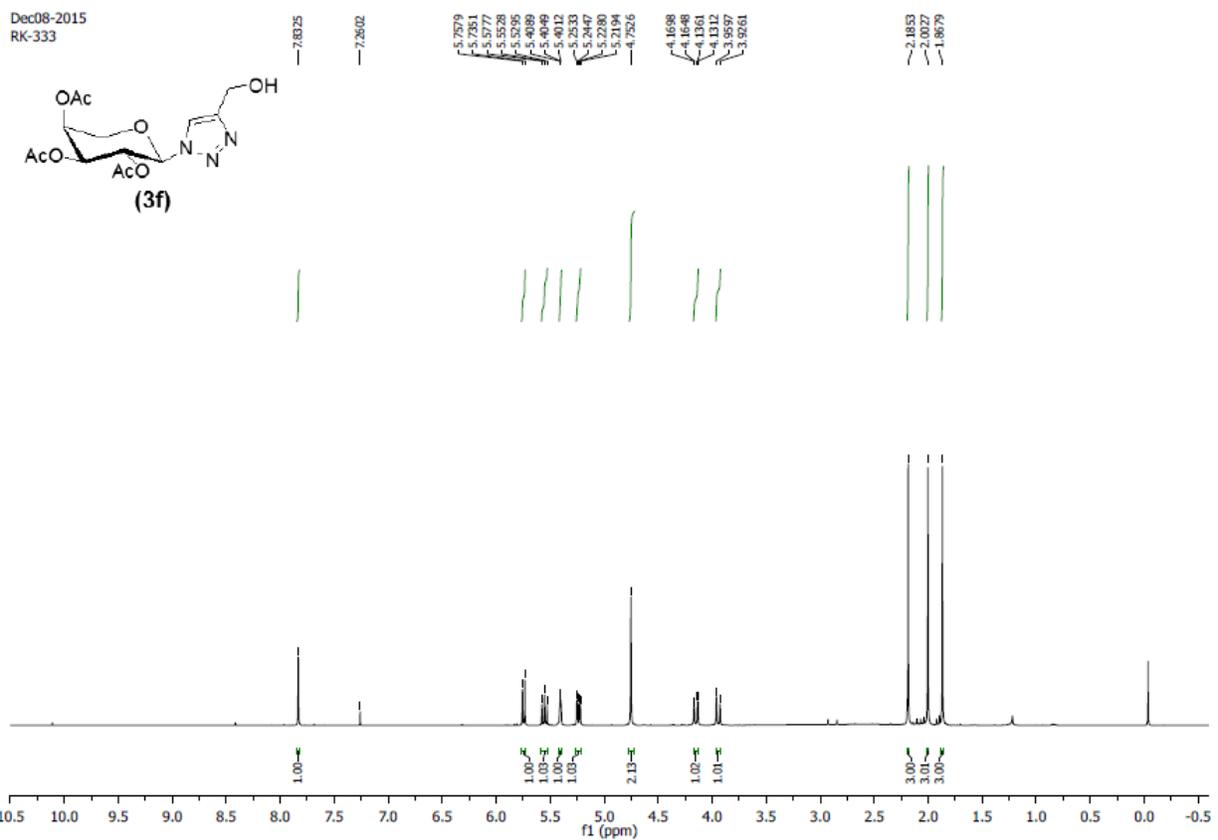


Figure S77. ¹H NMR spectra of **3f** in CDCl₃.

Dec08-2015
RK-333

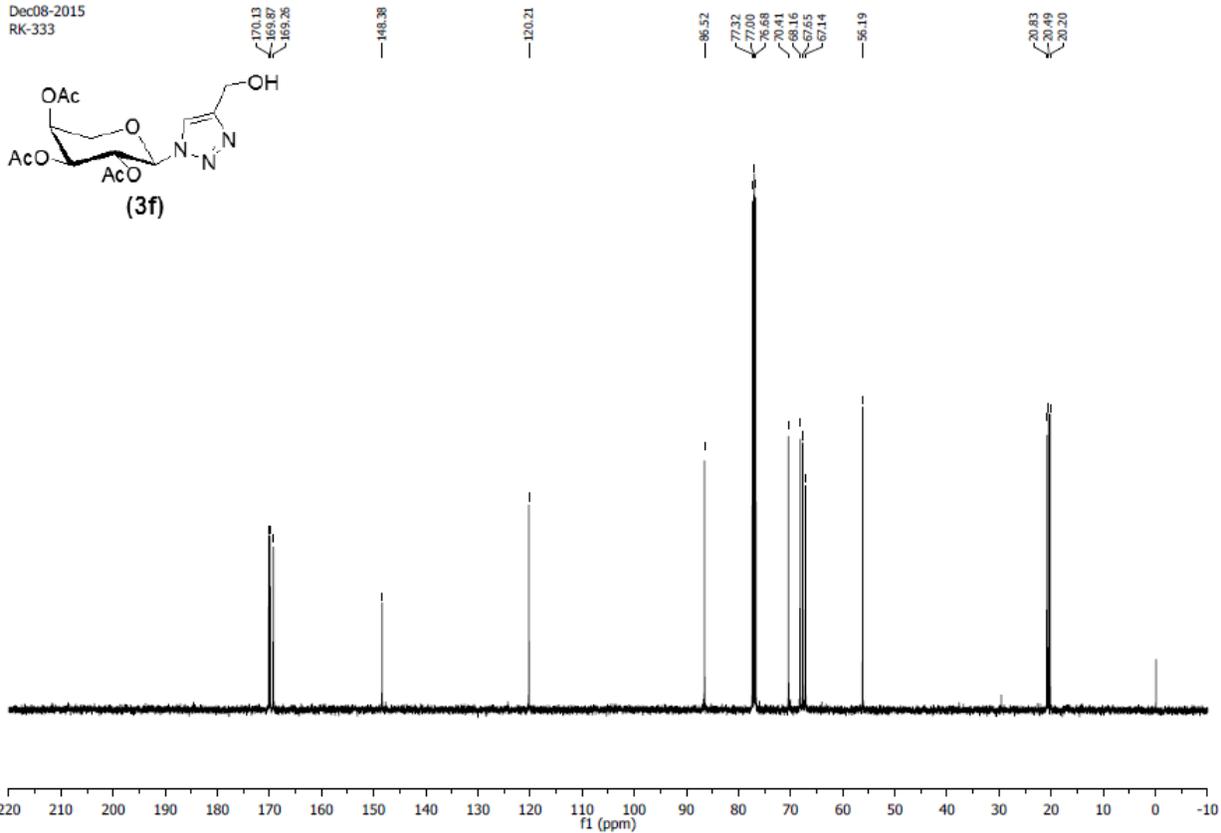


Figure S78. ^{13}C NMR spectra of **3f** in CDCl_3 .

Dec08-2015
RK-335

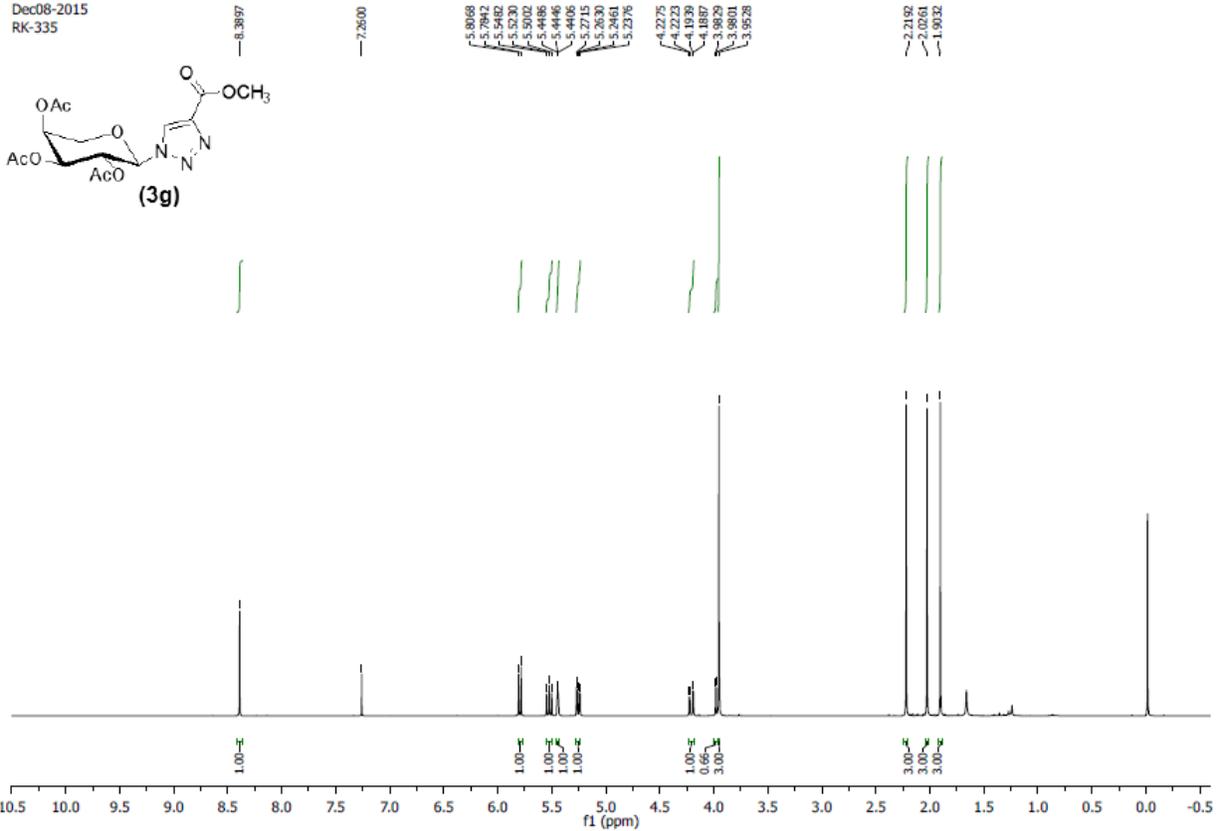


Figure S79. ^1H NMR spectra of **3g** in CDCl_3 .

Dec08-2015
RK-335

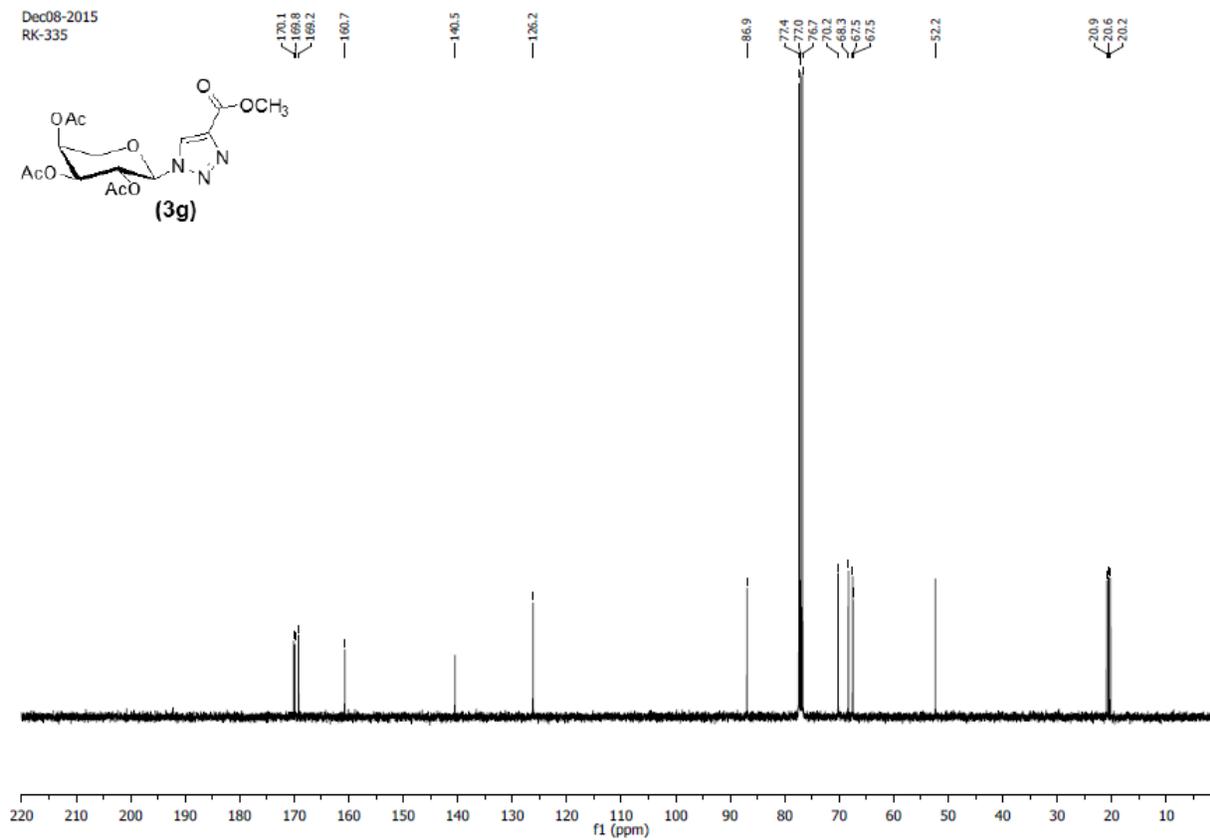
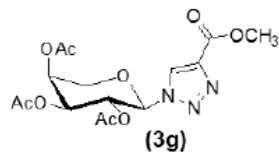


Figure S80. ^{13}C NMR spectra of **3g** in CDCl_3 .