

Electronic Supporting Information

Transient non-covalent hydrogel by dynamic covalent bond†

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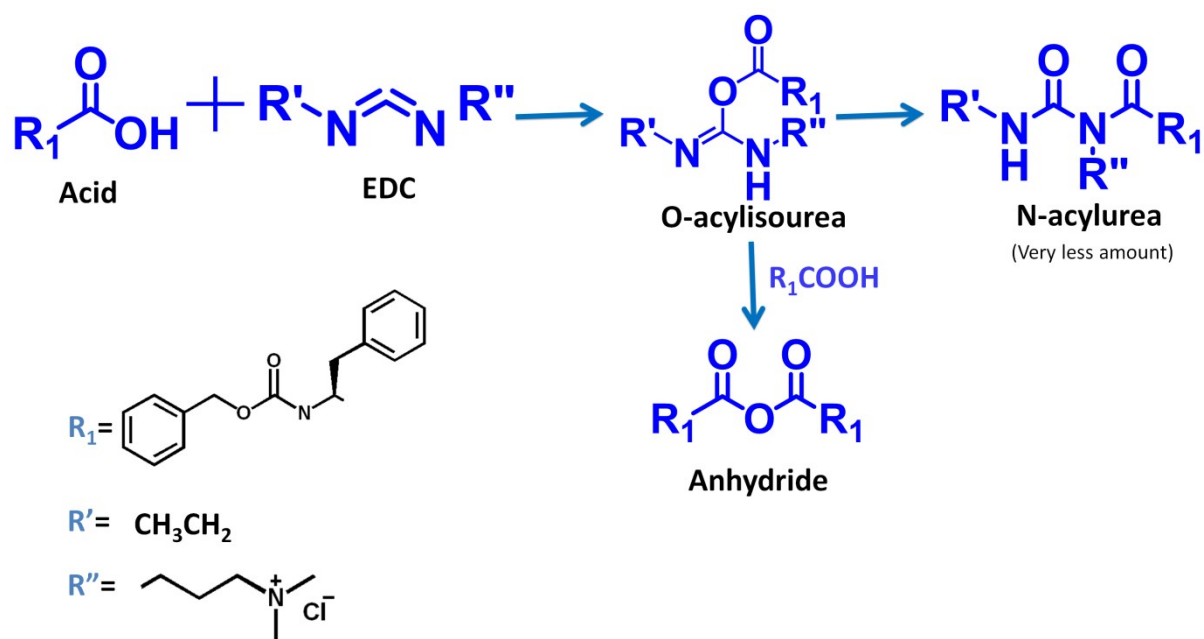
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Scheme 1. The schematic presentation of the reaction between **ZF** and EDC.

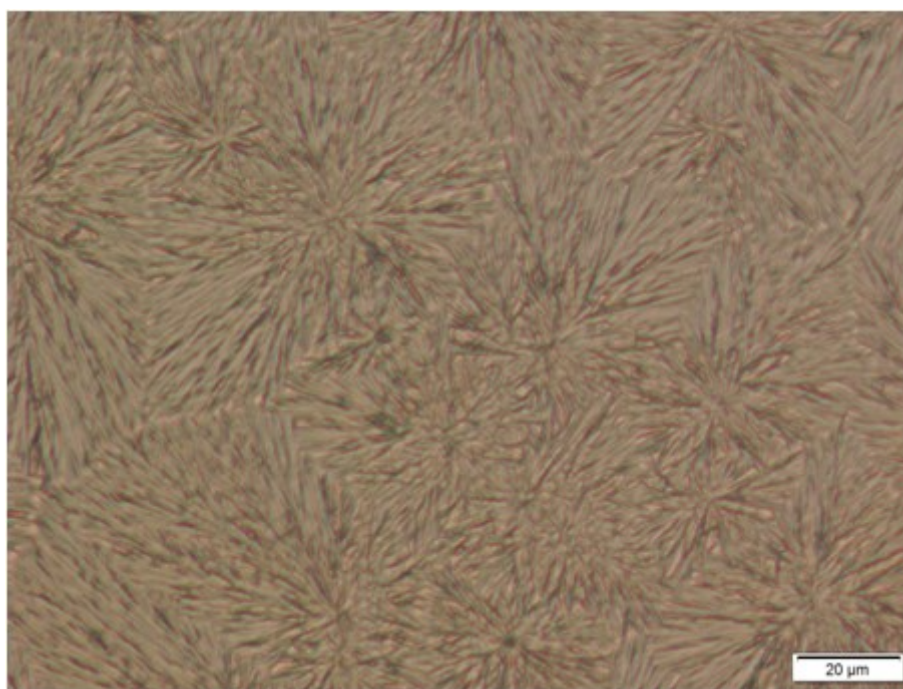


Fig. S1: POM image shows the entangled spherulitic morphology of **ZF** xerogel (dried hydrogel).

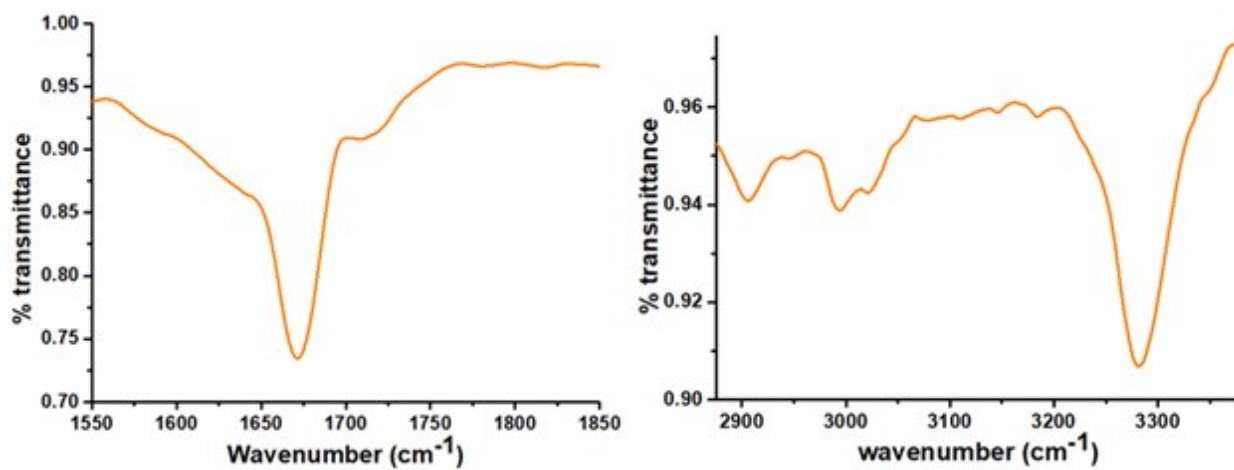


Fig. S2: ATR FT-IR spectra of ZF xerogel.

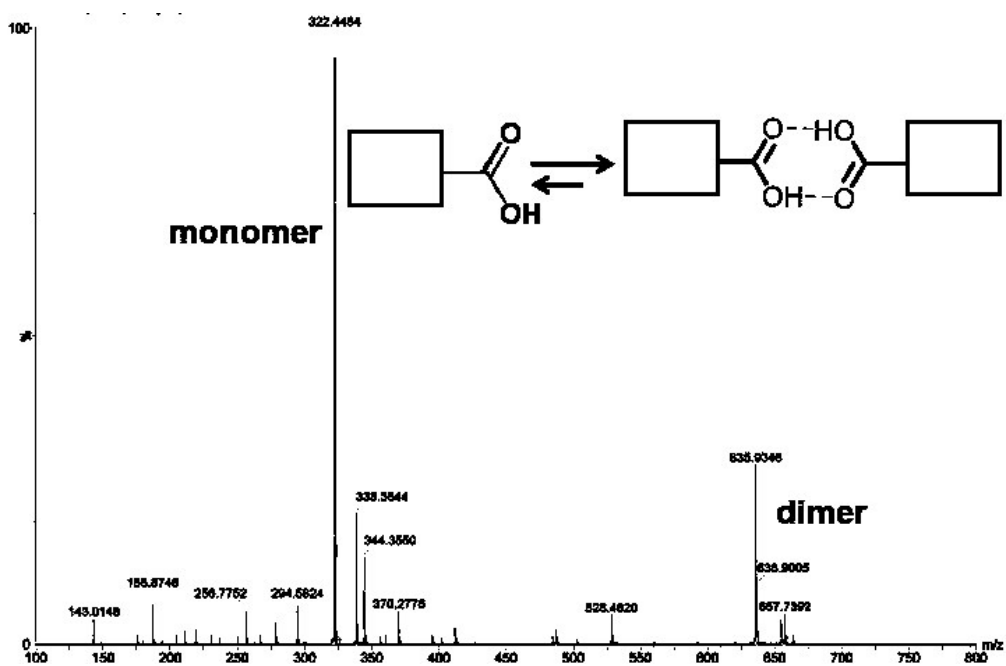


Fig. S3: MS spectra of ZF hydrogel showing simultaneous existence of monomer and dimer.

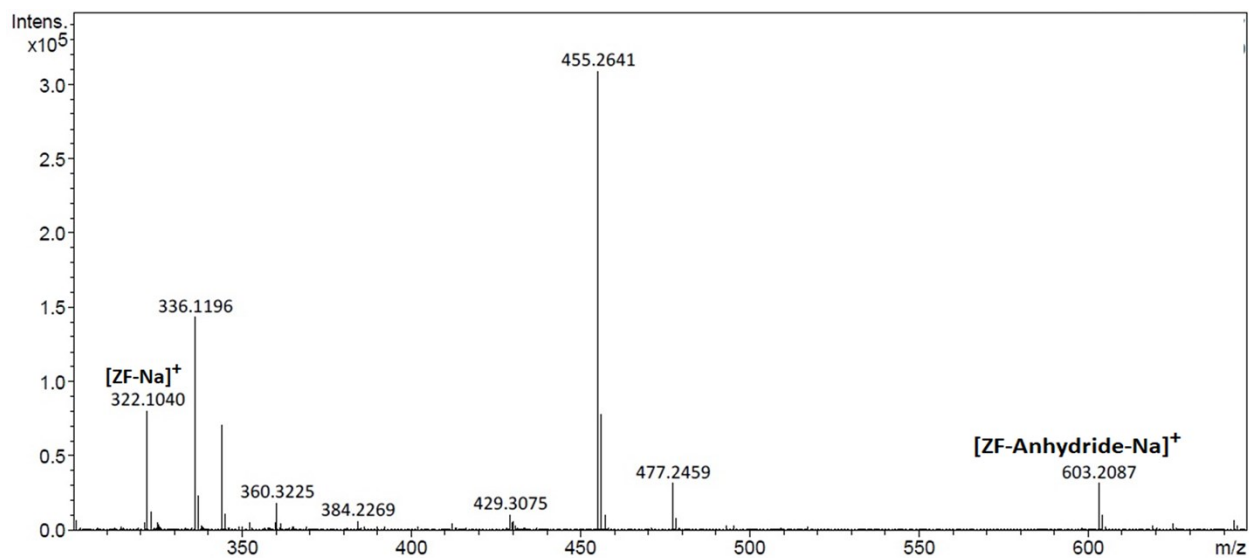


Fig. S4: Mass spectrum of the gel showing simultaneous existence of **ZF 1** and anhydride **2**.

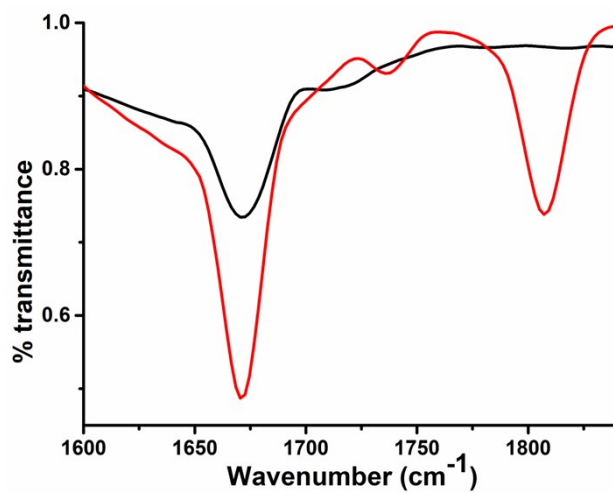


Fig. S5: ATR FT-IR spectra of **ZF** gel and **ZF-EDC** fuel gel. FT-IR spectra of transient gel (red) and static gel (black).

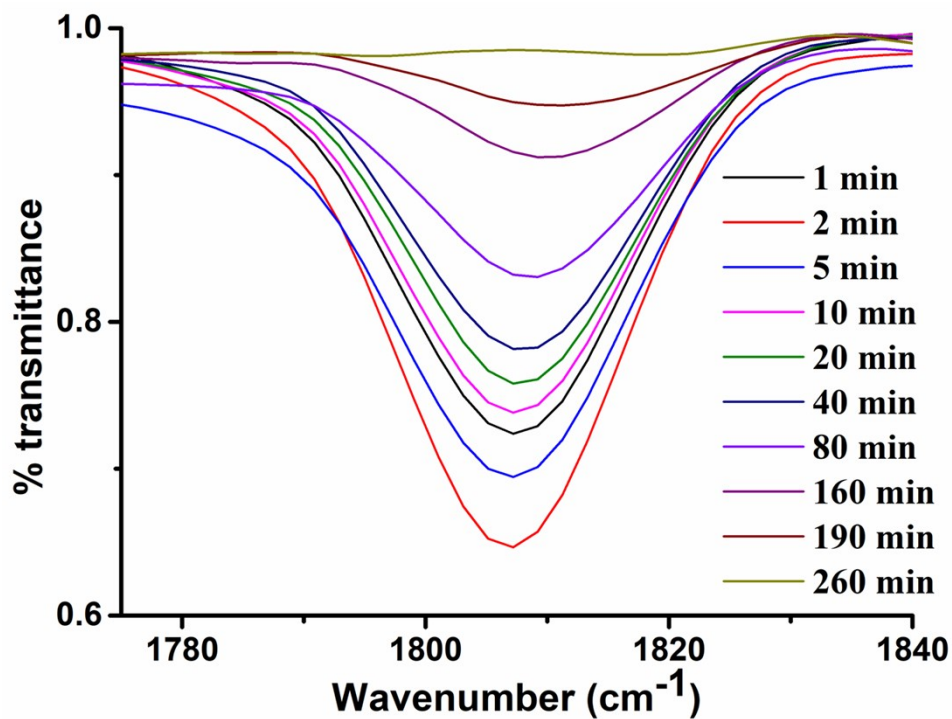


Fig. S6: The time-dependent changes of anhydride peak of ZF-EDC fuel transient hydrogel. Initially, a peak was observed at \square 1810 cm^{-1} , and gradually its intensity decreases and eventually disappear.

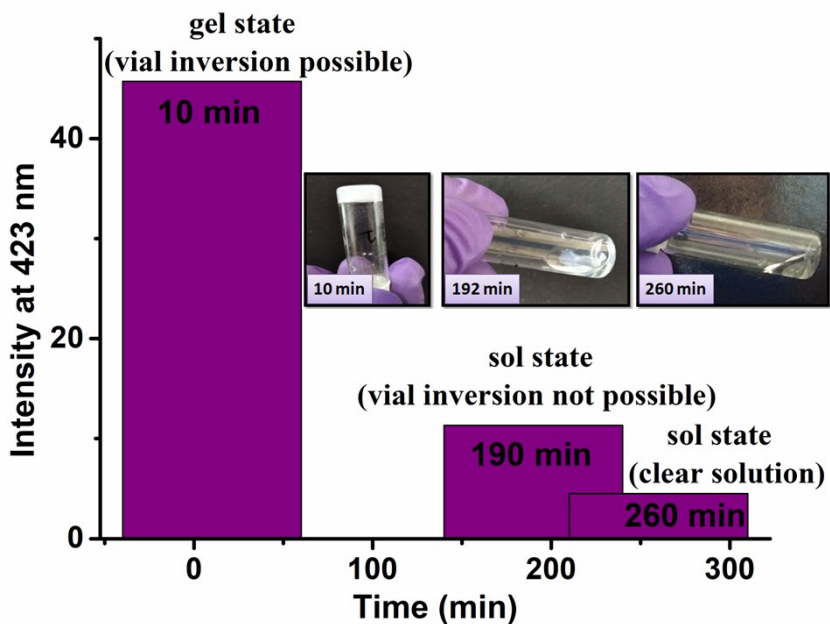


Fig. S7: Change in fluorescence intensity ($\lambda_{\text{ex}}= 258 \text{ nm}$) at 423 nm with time. From the emission study, we can say that sol-to-gel transition occurs at about 10 min and gel-to-sol transition occurs at about 192 min.

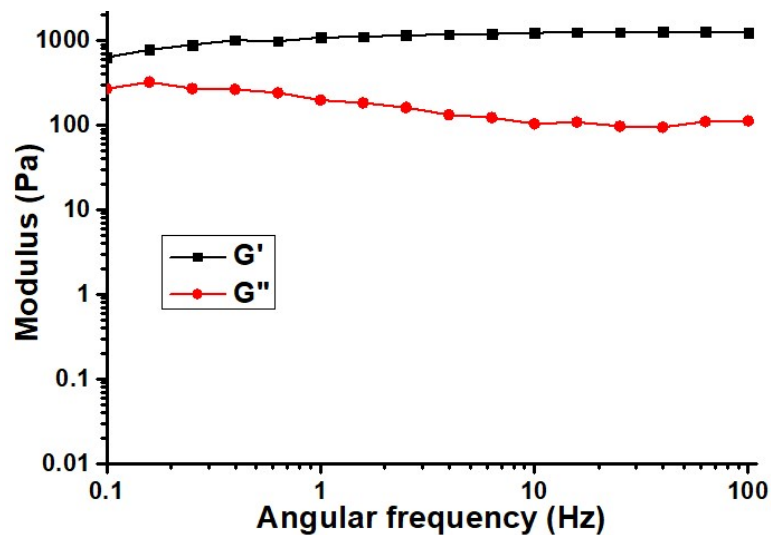


Fig. S8: Frequency sweep of the gel of ZF-EDC at a fixed strain of 0.1%.

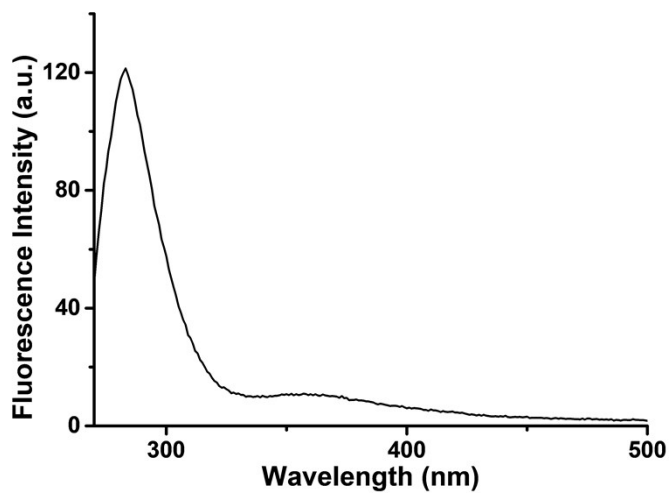


Fig. S9: Emission spectra after 260 min when complete sol conversion take place.

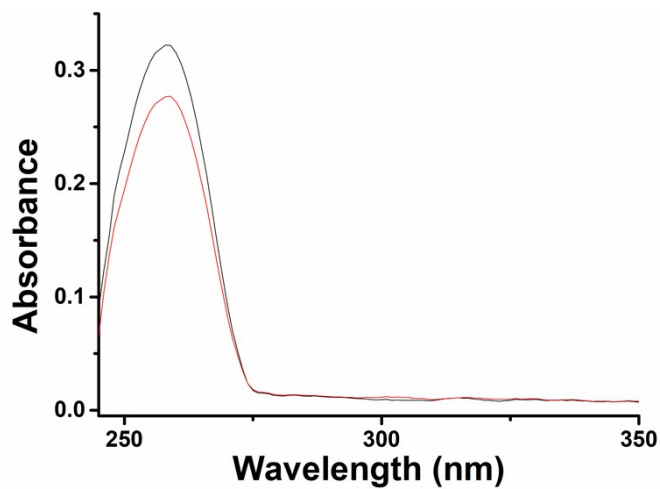


Fig. S10: UV-Vis spectrum of the ZF gel (red) and ZF solution (black).

Synthesis of Benzyloxycarbonyl-L-phenylalanine (ZF): following *Bioorganic Med. Chem. Lett.*, 2016, **26**, 5000

L-Phenylalanine (**F**) (3.3 g, 20 mmol) was stirred with THF (40 mL), and a solution of NaOH (1.7 g, 42.5 mmol) in water (20 mL) was added. The mixture was cooled in an ice bath, and then Benzyl chloroformate (CbzCl) (3.6 mL, 25 mmol) was added dropwise over 10 min. The reaction was kept to come in room temperature and was stirred overnight. The reaction mixture was taken in separating funnel and washed with hexanes (2 x 30 mL). Then the aqueous phase was acidified with conc. HCl to pH ~ 1 and the compound was extracted with EtOAc (3 x 30 mL). Combined organic phases were washed with brine and dried over Na₂SO₄ and evaporated under vacuum to obtain crude product as a waxy solid. Yield: 5.51 g (92%)

¹H NMR (500 MHz, DMSO-*d*₆, δ ppm): 12.73 (b, 1H, Acid OH), 7.64 (d, *J*=8, 1H, Phe NH), 7.35–7.19 (m, 10H, Aromatic H), 4.97 (s, 2H, Benzyl CH₂), 4.19 (m, 1H, Phe C^αH), 3.07 (dd, *J*= 5, 14, 1H, Phe C^βH), 2.83 (dd, *J*= 11, 14, 1H, Phe C^βH).

¹³C NMR (125 MHz, CDCl₃, δ ppm): 173.32, 155.83, 137.90, 136.94, 128.88, 128.28, 128.16, 127.71, 127.49, 126.37, 65.24, 55.50, 36.48.

Mass spectral data: TOF-MS(*m/z*) calculated for [M+Na]⁺ :322.12; found : 322.44.

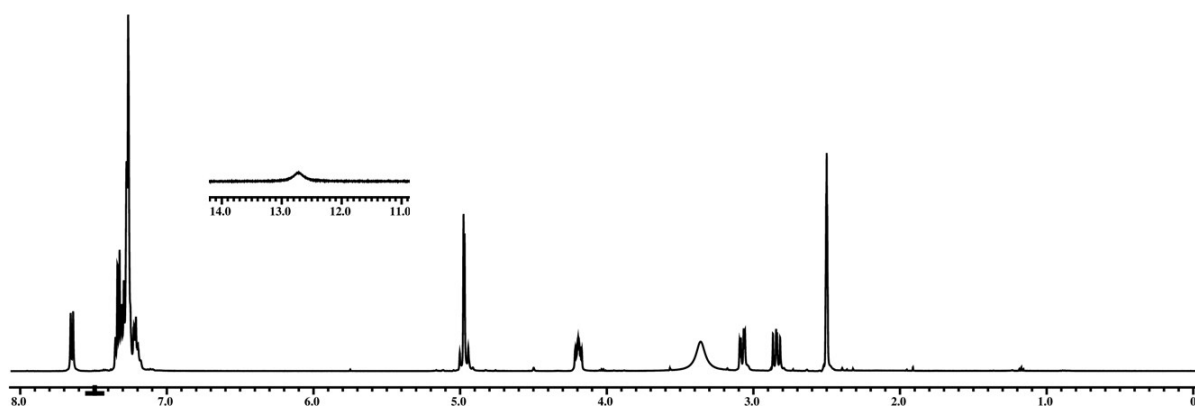


Fig. S11. ¹H NMR (500 MHz, DMSO-*d*₆) spectrum of **ZF**.

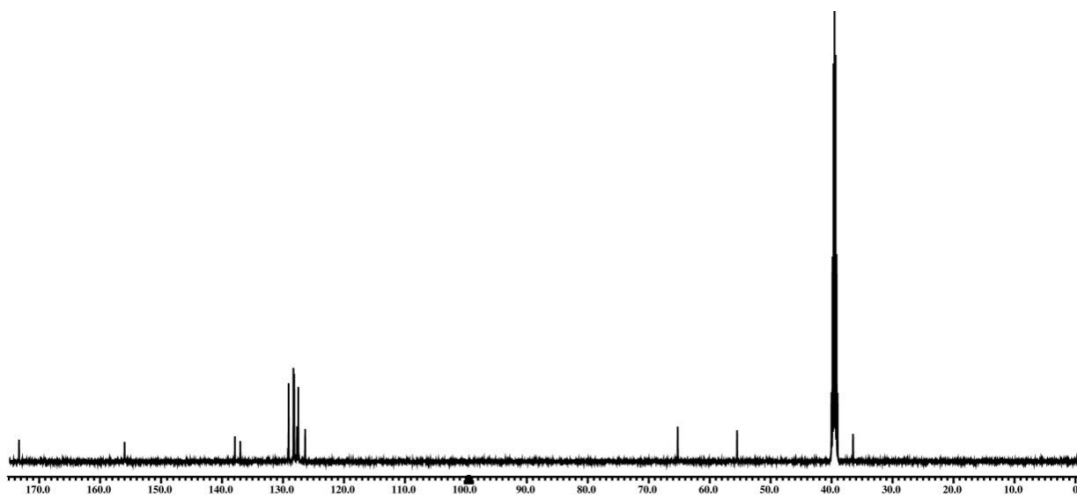


Fig. S12. ^{13}C NMR (125 MHz, $\text{DMSO-}d_6$) spectrum of **ZF**.

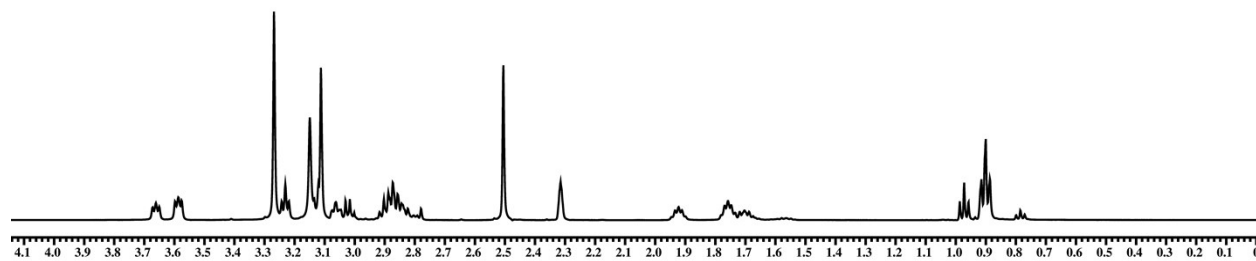


Fig. S13. ^1H NMR (500 MHz, $\text{DMSO-}d_6$) spectrum of **EDC.HCl**