

Supporting Information

A Free-Standing, Self-Healing Multi Stimuli Responsive Gel Showing Cryogenic Magnetic Cooling

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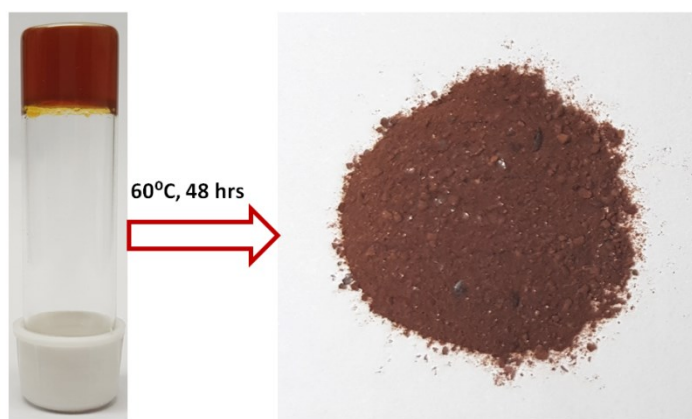


Fig. S1 Preparation of xerogel.

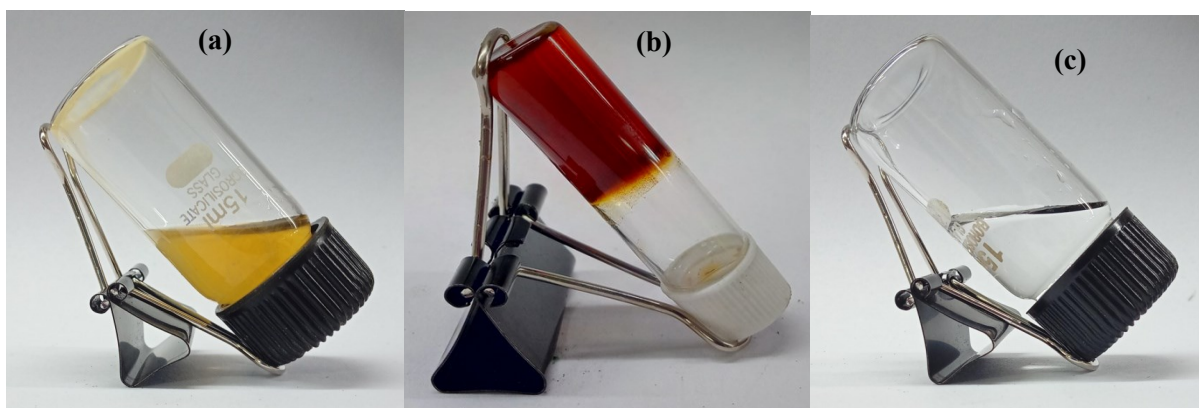


Fig. S2 (a) Solution of the reaction of anhy. FeCl_3 salt with H_2Pic in 1.5 : 1 molar ratio; (b) Solution of the reaction of anhy. FeCl_3 salt with H_2Pic in 3 : 1 molar ratio (c) solution of only ligand.

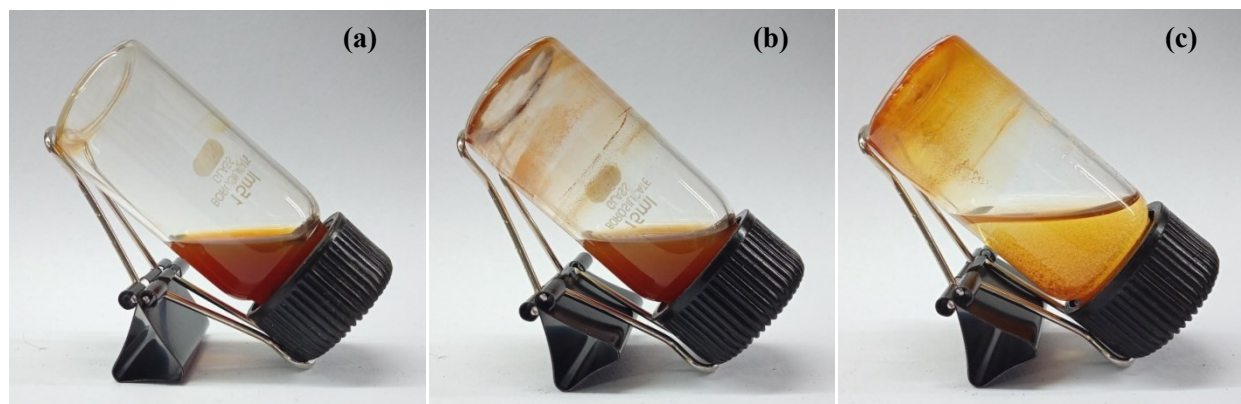


Fig. S3 (a) Solution of the reaction of $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ and H_2L ; (b) Solution of the reaction of FeSO_4 and H_2L ; (c) Solution of the reaction of $\text{Fe}(\text{ClO}_4)_3 \cdot 6\text{H}_2\text{O}$ and H_2L .

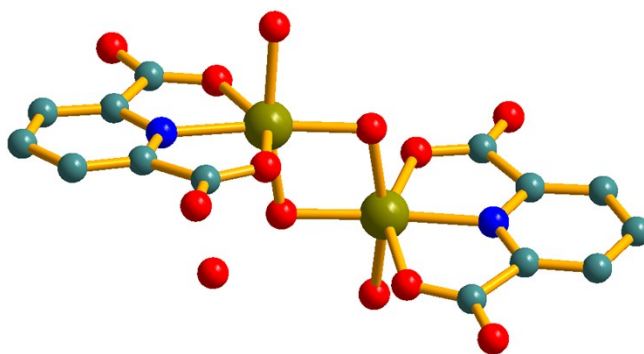


Fig. S4 (a) Molecular structure of $[\text{Dipic}(\text{H}_2\text{O})\text{FeOH}]_2 \cdot \text{H}_2\text{O}$.

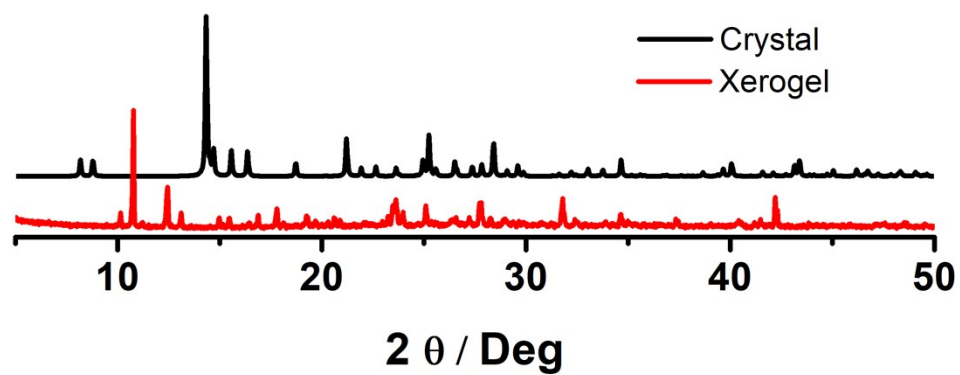


Fig. S5 PXRD pattern of xerogel from freshly prepared gel and the crystal of $[\text{Dipic}(\text{H}_2\text{O})\text{FeOH}]_2 \cdot \text{H}_2\text{O}$.

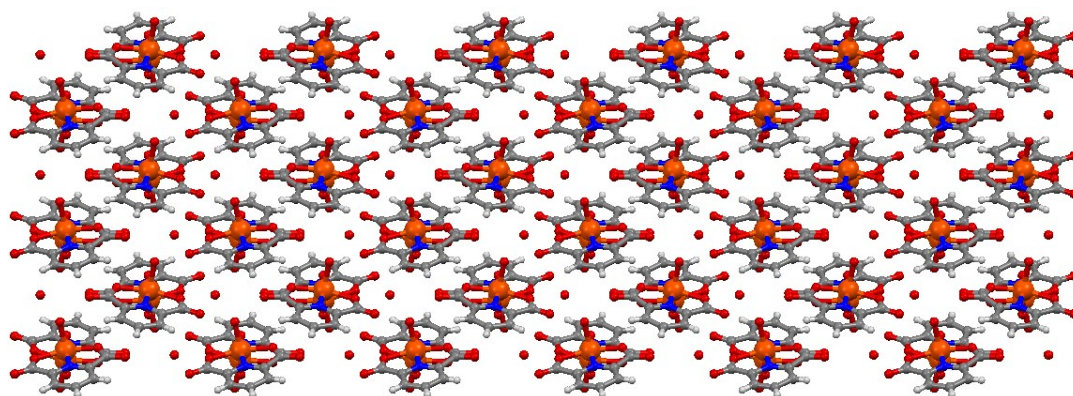


Fig. S6 Packing diagram of [Dipic(H₂O)FeOH]₂·H₂O along a-axis.

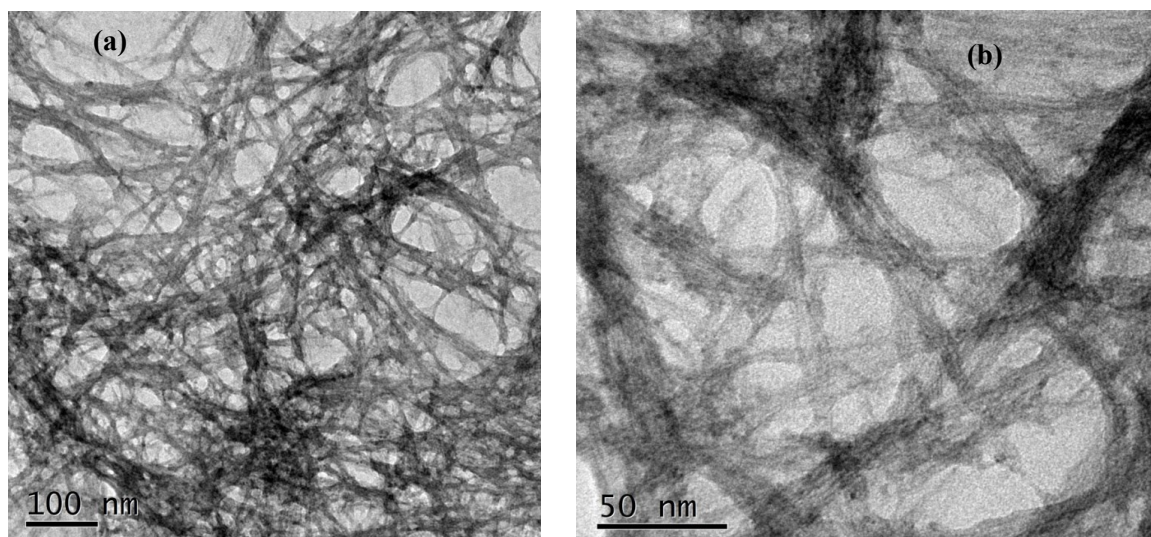


Fig. S7 TEM images showing (a) fibrous morphology, (b) HR image of freshly prepared gel.

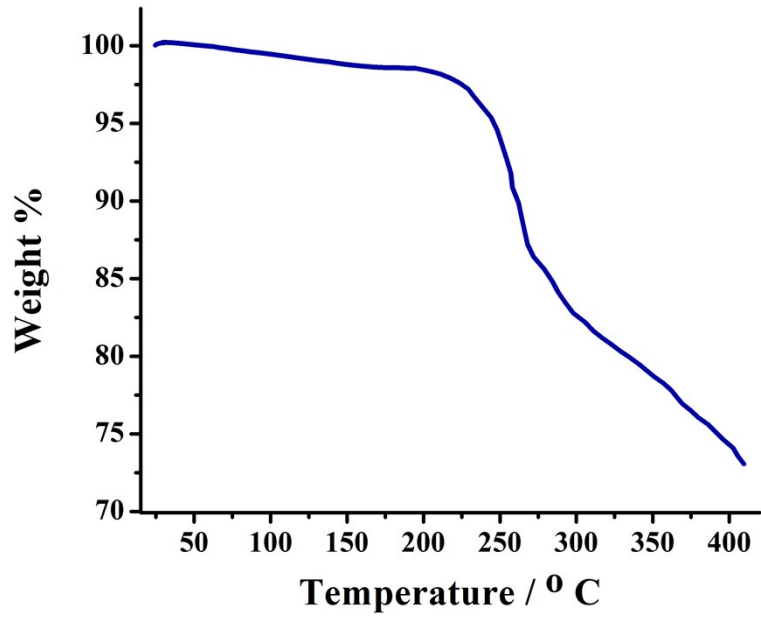


Fig. S8 TG analysis of the freshly prepared xerogel.

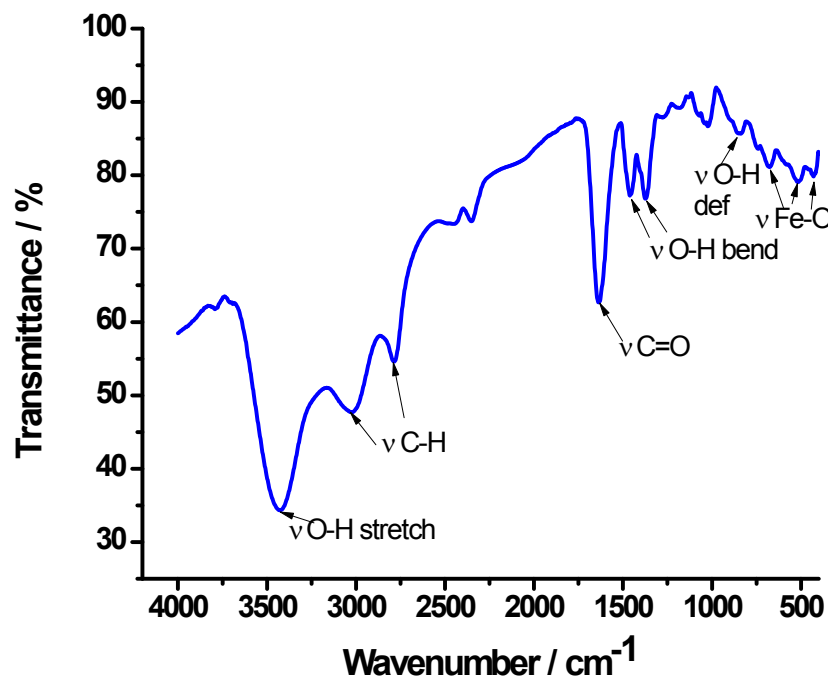


Fig. S9 FT-IR plot of as synthesized gel.

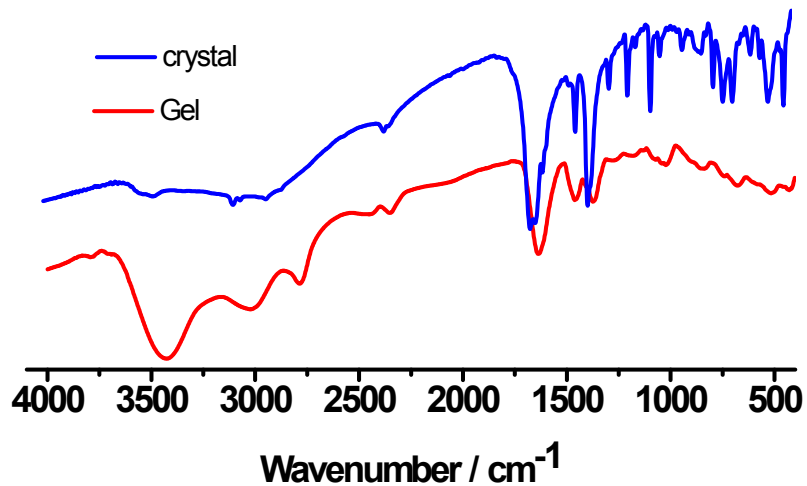


Fig. S10 Comparison of FT-IR plots of as synthesized gel and crystalline material of $[\text{Dipic}(\text{H}_2\text{O})\text{FeOH}]_2 \cdot \text{H}_2\text{O}$.

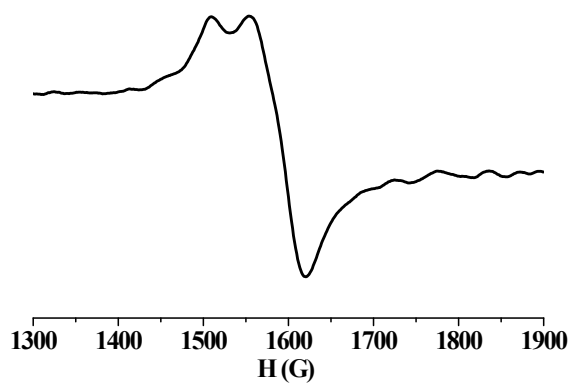


Fig. S11 EPR spectrum of as synthesized gel.

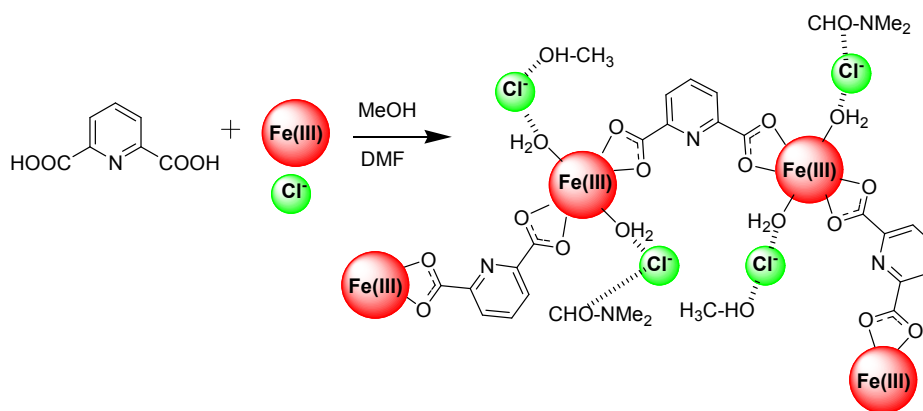


Fig. S12 Probable self-assembly of the formation of synthesized gel.

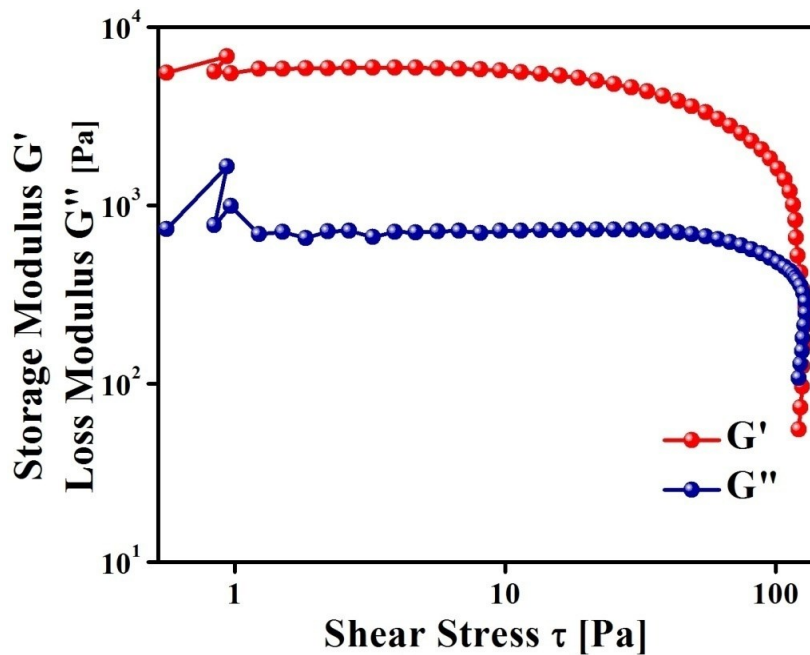


Fig. S13 Stress sweep experiment of the gel.

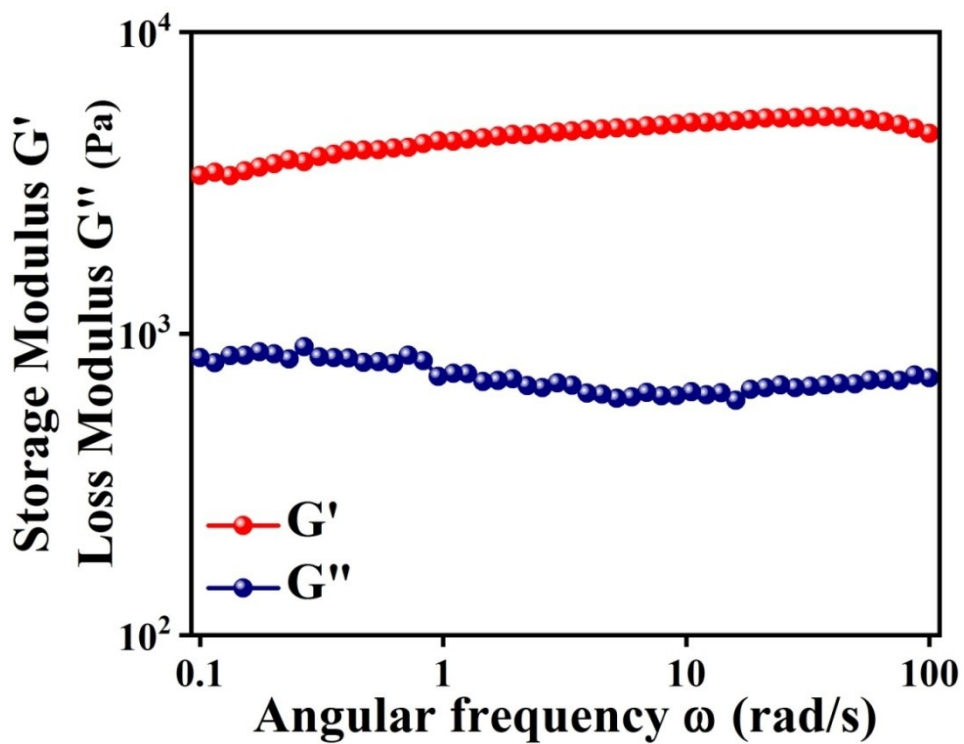


Fig. S14 Frequency sweep experiment of the gel.



Fig. S15 Reduction of Fe(III) to Fe(II) of metallogel by ascorbic acid.

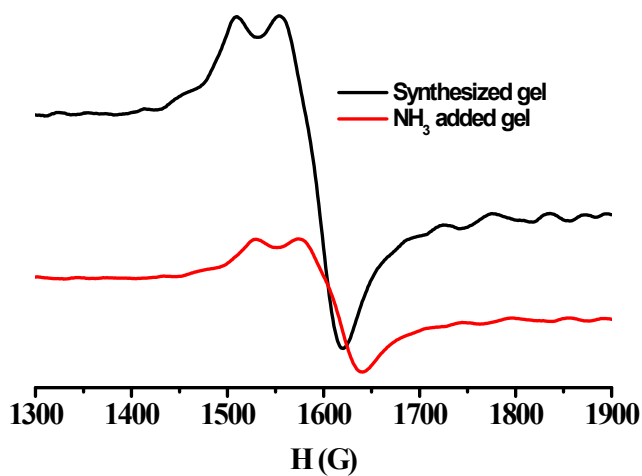


Fig. S16 Comparison of EPR spectra of as synthesized gel and the gel after addition of NH_3 .

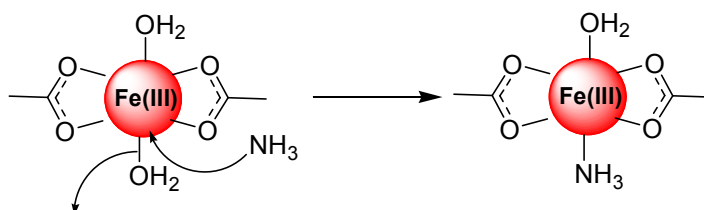


Fig. S17 Probable change in geometry around Fe(III) during NH_3 sensing.

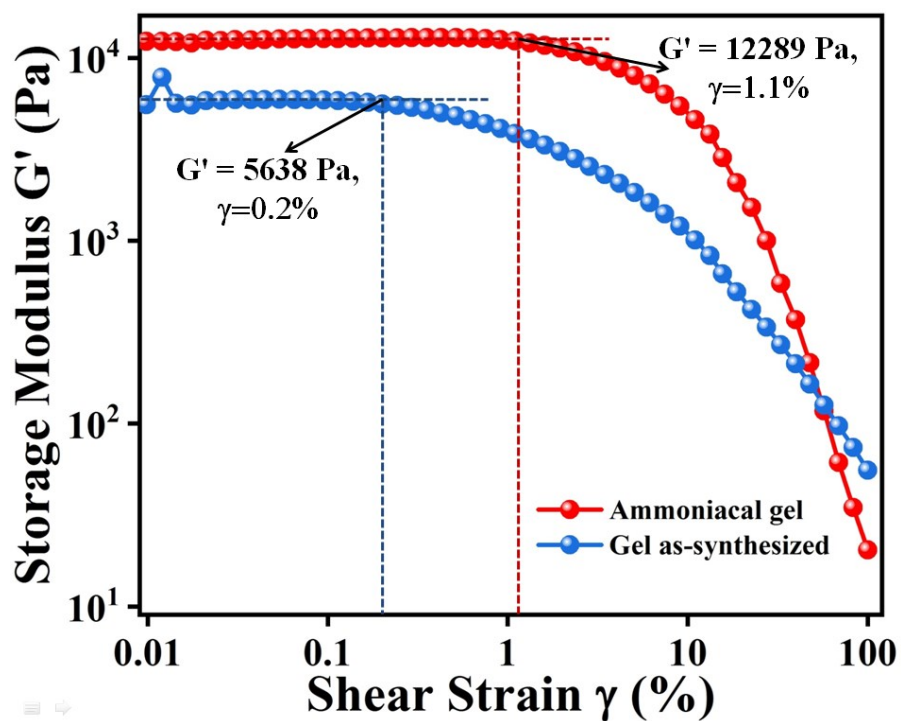


Fig. S18 Comparison of strength between ammoniacal gel and gel as-synthesized.

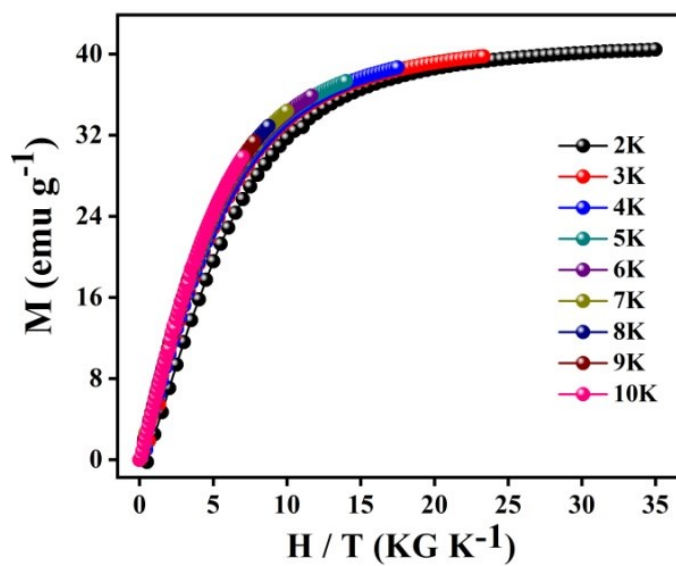


Fig. S19 Isothermal normalized magnetizations vs. field/temperature plot of the xerogel.

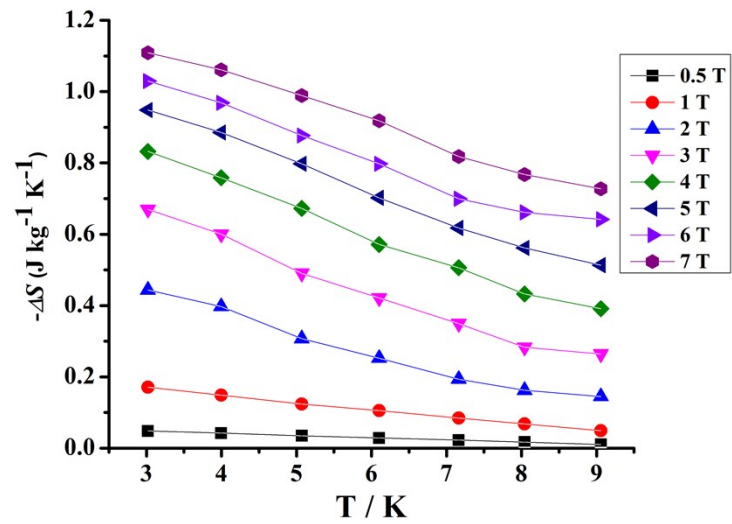


Fig. S20 Magnetic entropy changes of the $[\text{Dipic}(\text{H}_2\text{O})\text{FeOH}]_2 \cdot \text{H}_2\text{O}$.