Electronic Supplementary Material (ESI) for Soft Matter.

Supporting Information of

Fabrication of Bifunctional Supramolecular Glycolipid-based Nanocomposite Gel: Insights into Electrocatalytic Performance with Effective Selectivity Towards Gold

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Thermoreversibility.

To check the thermoreversibility of gel nanocomposite, 1 mL of gel sample was taken in a sealed glass vial. Then the glass vial with sample was heated in a water bath (~ 70 °C) and allowed to melt the gel sample completely. Melting of gel sample was observed by tilting the vial. After that, the sample was brought outside the water bath and allowed to cool to room temperature. Regaining of the gel state was confirmed by inverting the vial.

Anti-freeze Property.

Gel nanocomposite sample (1 mL) in a sealed glass vial was kept in deep freezer (–20 °C) for 1 week. After 1 week, sample was physically analyzed to check the effect of low temperature at -20 °C as well as after coming to room temperature.

Injectability.

To study the injectability, nanocomposite gel was taken in a 1 mL syringe. The sample was then slowly extruded from the syringe in a glass vial. After complete transferring the sample to the vial, stability of gel was checked by vial inversion method.

Table S1 Activation energy (E_a) and conductivity at infinite temperature (σ_0) calculated using Arrhenius plots.

	ANC-5		**18:1M-W**	
	Before transition	After transition	Before transition	After transition
E_a (J/mol)	0.24	0.17	0.12	0.19
σ_0 (mS/cm)	225	21.5	1.63	28.1

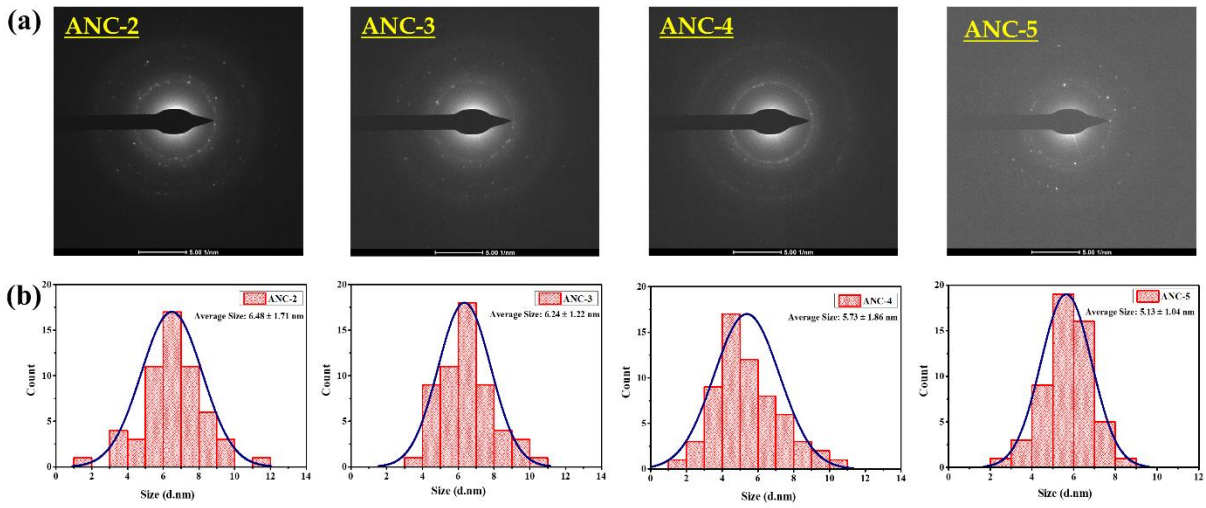

Fig. S1 (a) Selected area electron diffraction (SAED) pattern of the gold nanoparticles; (b) Histogram of particle size distribution in gel nanocomposite measured from HR-TEM images.

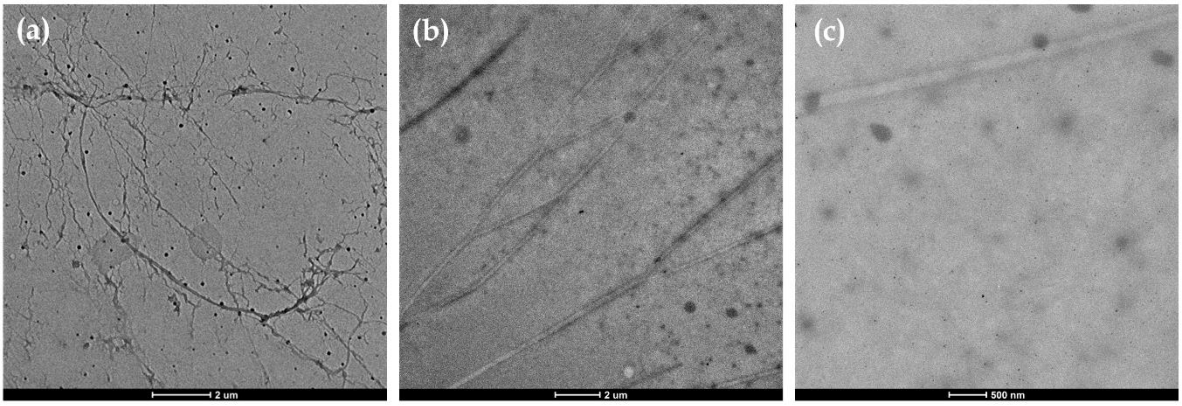

Fig. S2 HR-TEM images of hydrogel **18:1M-W** (a); GNP embedded within the fibrillar 3D network of nanocomposite hydrogel (b, c).

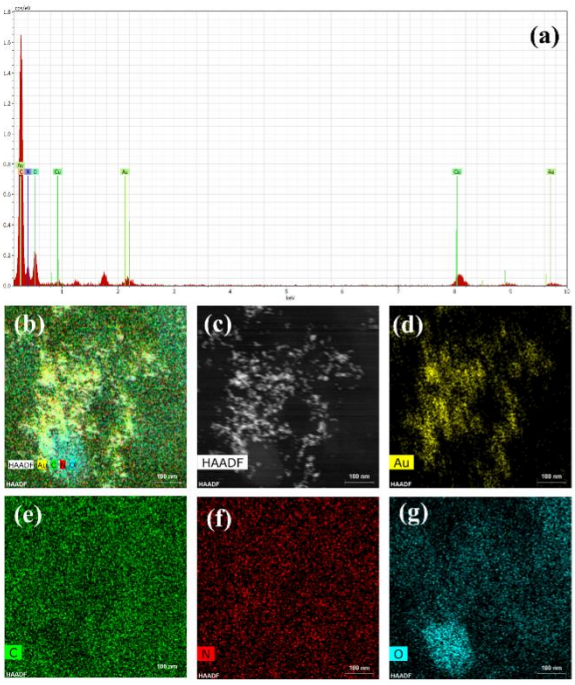

Fig. S3 (a) EDXA profile of gold nanoparticles; Elemental mapping in HR-TEM images of gold gel nanocomposites for different elements (b, c, d, e, f, g).

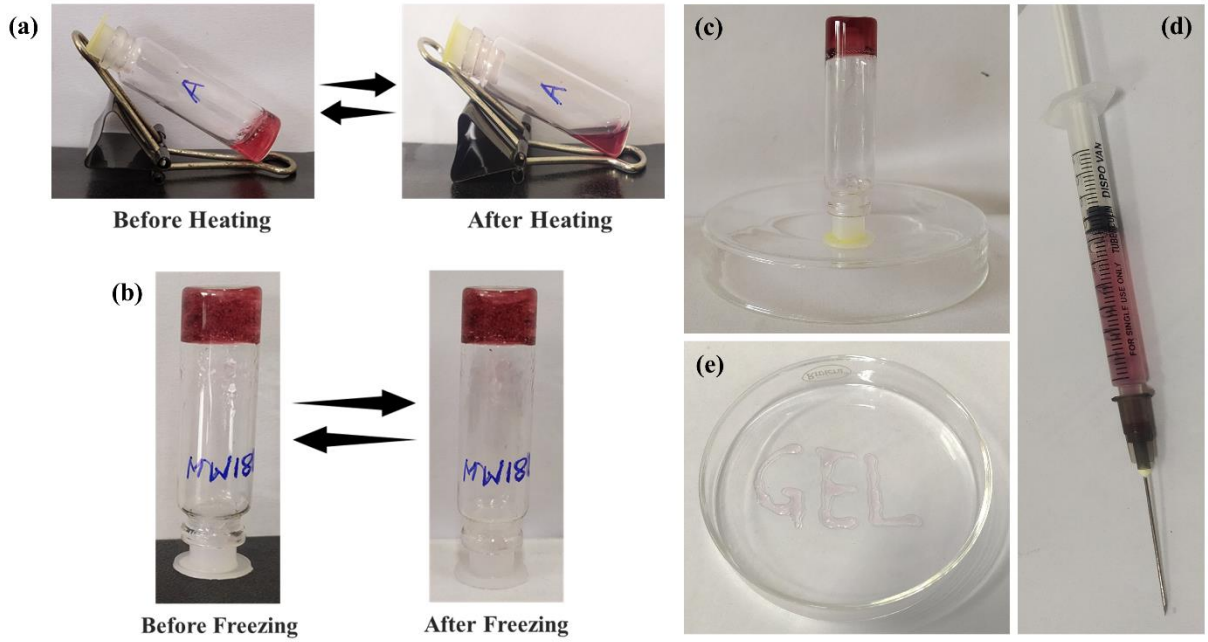

Fig. S4 Photographs of vials containing nanocomposite gel demonstrating thermoreversibility (a); antifreeze experiment (b); (c) regaining of the gel state after extruding the nanocomposite gel from syringe; (d) nanocomposite gel in a syringe; (e) injectability of nanocomposite gel.

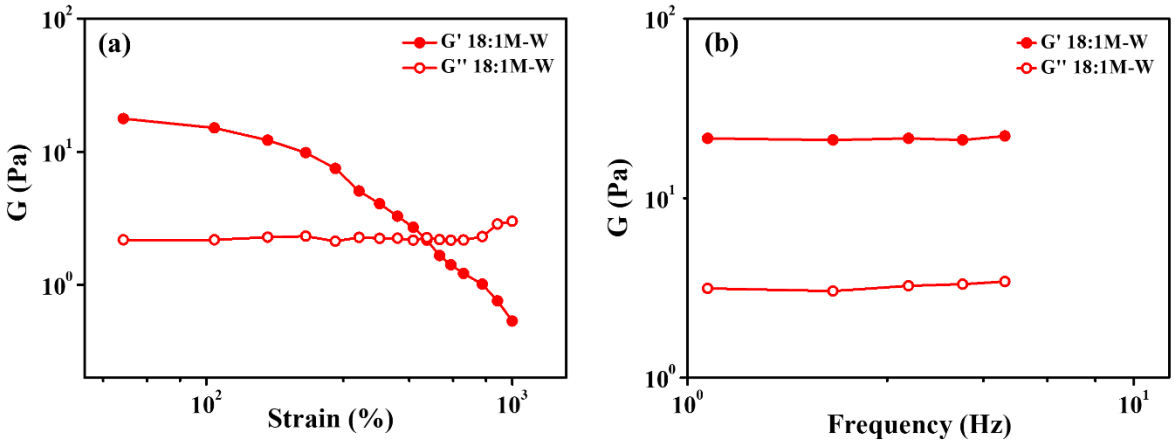

Fig. S5 (a) Variation of moduli (G′ and G″) with strain at constant frequency of 1 Hz; (b) variation of moduli (G′ and G″) with frequency at constant strain of 1 % of hydrogel **18:1M-W**.

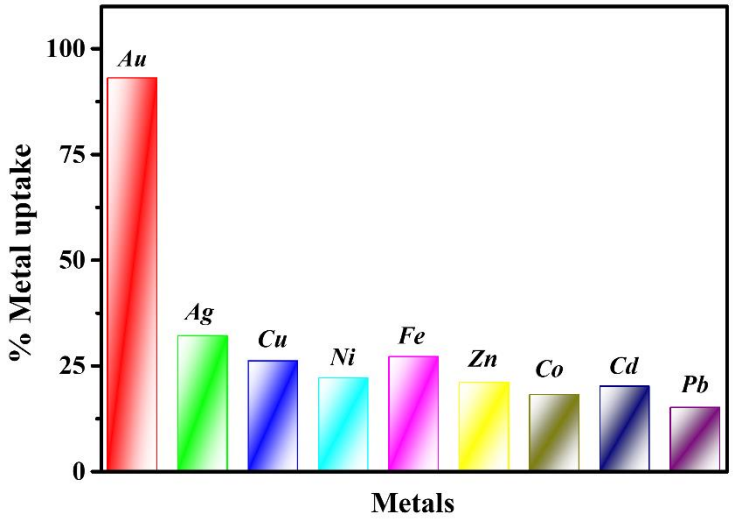

Fig. S6 Percentage metal ion uptake from mixed metal solutions by nanocomposite hydrogel.

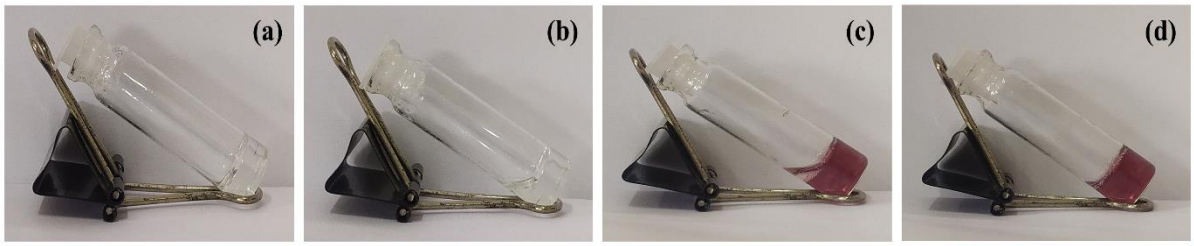

Fig. S7 (a) Hydrogel **18:1M-W**; (b) addition of mixed metal solution to the top of the hydrogel; (c) selective reduction of gold within hydrogel with remaining metals in supernatant; (d) gel nanocomposite after subjecting the supernatant for AAS.

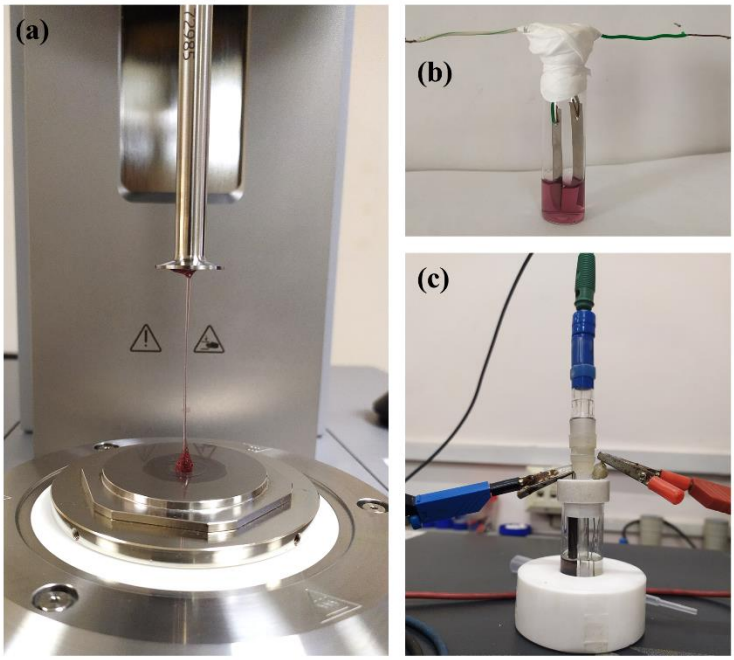

Fig. S8 Photograph of gel demonstrating the viscoelastic strength of nanocomposite gel (a); cell setup used for conductivity measurements (b) and cyclic voltammetry experiments (c).