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Supporting information for publication

Thermosensitive antibacterial Ag nanocomposite hydrogels made by one-step green synthesis strategy

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Experimental section

Materials.

N-isopropylacrylamide (NIPAm) was available from Tokyo Chemical Industry Co., Ltd and purified by recrystallization from n-hexane and toluene mixture followed by drying under vacuum at 40 °C. N-(hydroxymethyl) acrylamide (HMAm) was purchased by Aladdin Industrial Corporation and used without further purification. Synthetic laponite clay ($[Mg_{5.34}Li_{0.66}Si_8O_{20}(OH)_4]Na_{0.66}$, layer size, 20-30 nm × 1 nm; cation-exchange capacity, 104 mequiv/100 g) was provided by Rockwood Ltd, USA and used as received. Potassium peroxodisulfate (KPS, initiator) was purchased from Tianjin Kermel Chemical Reagent Co., Ltd. Silver Nitrate ($AgNO_3$) was used from Tianjin Chemical Technology Development Co. Ltd. The water used for all experiments was obtained from a Millipore direct-Q5 purification system.

Characterization.

The UV-Vis absorption spectrum of AgNPs was performed on Varian 95011211 ultraviolet spectrophotometer. The size and morphology of the as-prepared AgNPs and Ag-NC gels were examined by transmission electron microscopy (TEM, JEOL JEM-2100F) operating at 200 kV. The morphology of freeze-dried Ag-NC gels was observed by scanning electron microscopy (SEM, quanta 250 FEI Co., USA). The crystalline phase for both AgNPs and Ag-NC gel was determined by powder X-ray diffraction (XRD) pattern (Rikagu diffractometer, Cu radiation, λ= 0.1546 nm). Silver release from hydrogel was analyzed by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) using a Metrohm (Switzerland), 761 Compact IC. Specimens were prepared by immersing the Ag-NC gel (2.5 g) in 100 mL of deionized water at 37 °C for 10 days. The deionized water was replaced after 2, 4, 6, 8, 10 days and analyzed the silver content.

Tab. S1 Compositions in the reaction solution for Ag-NC gels with different monomer ratios.

Hydrogels [a)]	HMAm/g	NIPAm/g	$AgNO_3$/ml [b)]	H_2O/g	Clay/g	KPS/g
Ag0-NC50	0.505	0.565	0	10	0.32	0.01
Ag1-NC50	0.505	0.565	0.1	10	0.32	0.01
Ag5-NC50	0.505	0.565	0.5	10	0.32	0.01
Ag10-NC50	0.505	0.565	1.0	10	0.32	0.01
Ag5-NC70	0.303	0.791	0.5	10	0.32	0.01
Ag5-NC80	0.202	0.904	0.5	10	0.32	0.01
Ag5-NC90	0.101	1.017	0.5	10	0.32	0.01

a) Ag0, Ag1, Ag5, Ag10 in the Ag-NC gel stand for the amount of $AgNO_3$ solution of 0, 1.0 mmol, 5.0 mmol, 10.0 mmol, respectively; NC50, NC70, NC80, NC90 represent the NIPAm of 50 mol%, 70 mol%, 80 mol%, 90 mol%, respectively. b) The concentration of $AgNO_3$ is 100 mM.

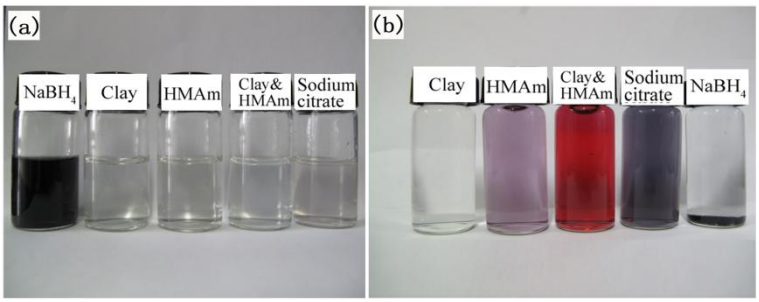

Fig. S1. The visual colour change of solution under different reduction conditions ($NaBH_4$, Clay, HMAm, Clay&HMAm and Sodium citrate) (a) before reduction and (b) 5h after reduction.

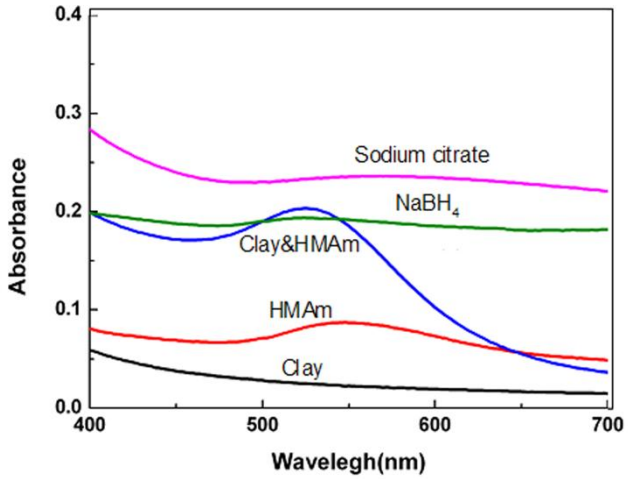

Fig. S2. The UV-VIS spectra of Au NPs under different reduction conditions (clay, HMAm,clay&HMAm, $NaBH_4$ and sodium citrate, respectively)

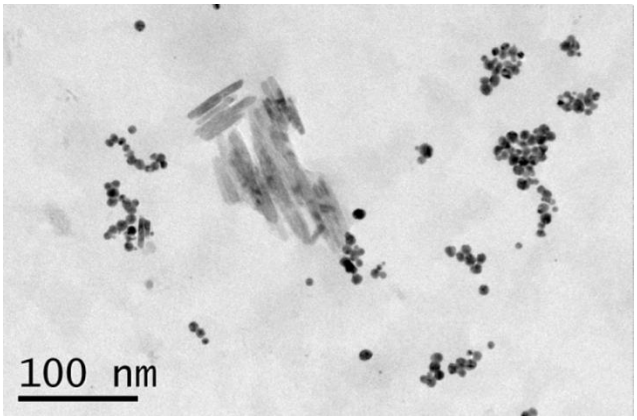

Fig. S3. The TEM image of Au NPs generated from Clay/HMAm/HAuCl