

## Supplementary Information

### **Fast and efficient synthesis of thiolate Ag<sub>44</sub> and Au<sub>12</sub>Ag<sub>32</sub> nanoclusters via CTAB reverse micelles**

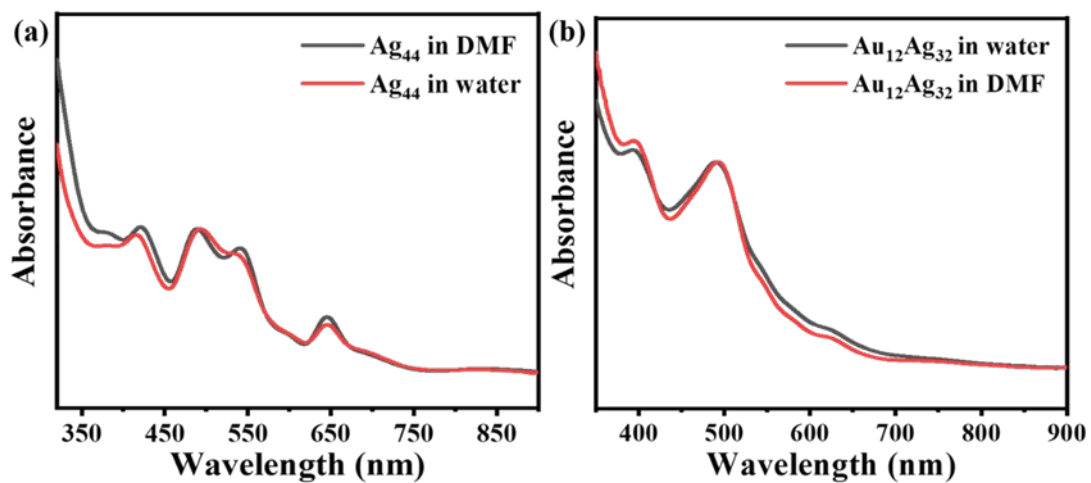
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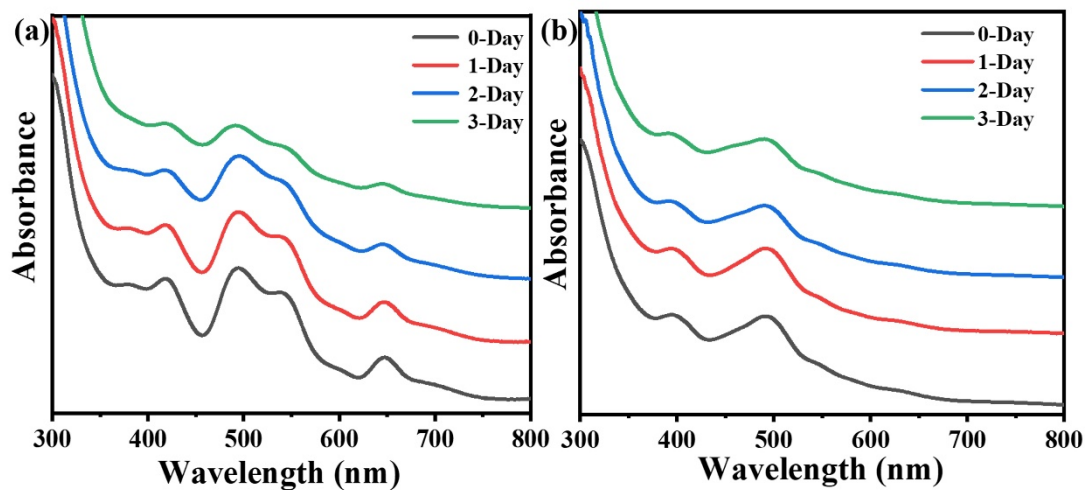
Email: zhht@scut.edu.cn

<sup>b</sup> Guangdong Engineering and Technology Research Center for Surface Chemistry of Energy Materials, School of Environment and Energy, South China University of Technology, Guangzhou Higher Education Mega Centre, Guangzhou, 510006, China

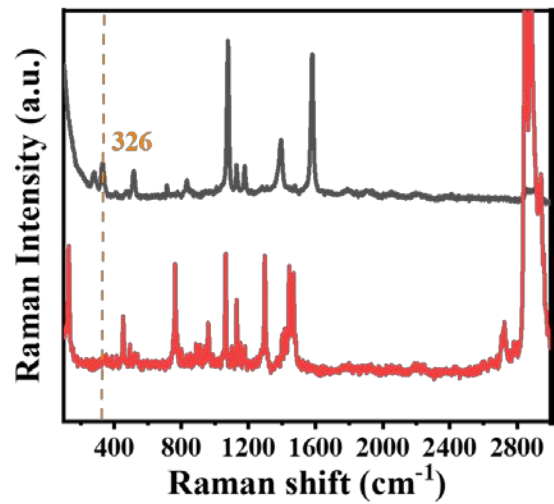
<sup>c</sup> Petrochina Yunnan Petrochemical Company Limited, Kunming, 650000, China



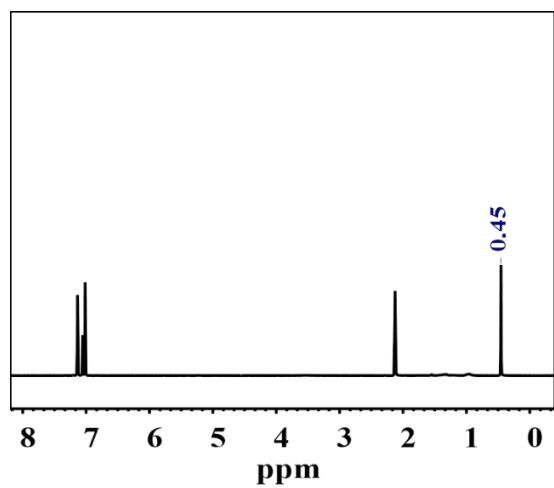
**Figure S1** (a) UV-vis absorbance spectra of the as-synthesized  $\text{Ag}_{44}$  NCs in water and DMF, (b) UV-vis absorbance spectra of the as-synthesized  $\text{Au}_{12}\text{Ag}_{32}$  NCs in DMF and water.



**Figure S2** UV-vis absorbance spectra of the reaction solutions of (a)  $\text{Ag}_{44}(\text{p-MBA})_{30}$  and (b)  $\text{Au}_{12}\text{Ag}_{32}(\text{p-MBA})_{30}$  at room temperature in toluene with the change of time.



**Figure S3** Raman spectra of the toluene phase (black line) and the aqueous phase (red line) when synthesizing Au<sub>12</sub>Ag<sub>32</sub> NCs.



**Figure S4** <sup>1</sup>H NMR spectrum of free water in toluene-d<sub>8</sub>.

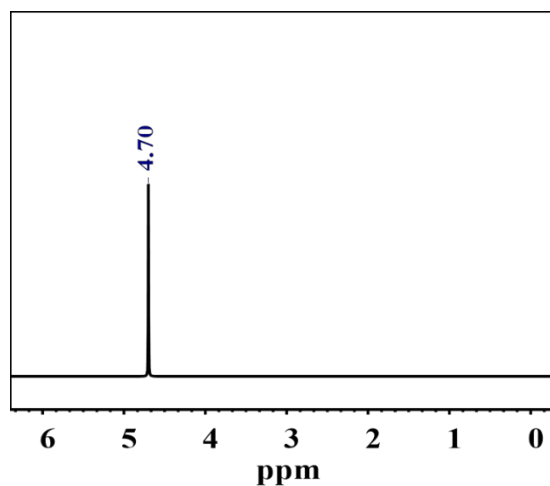


Figure S5 <sup>1</sup>H NMR spectrum of ordinary water in D<sub>2</sub>O.

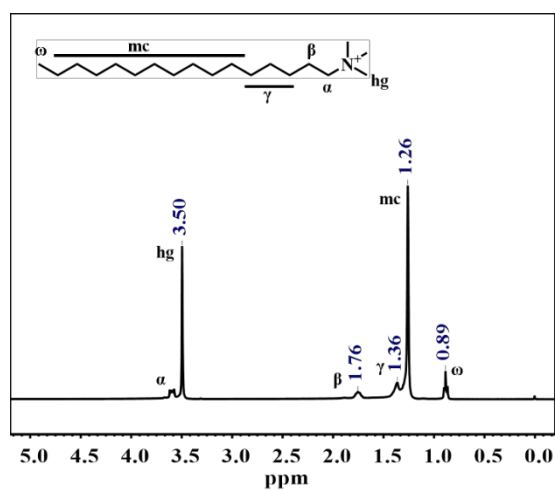


Figure S6 <sup>1</sup>H NMR spectrum of pure CTAB in CDCl<sub>3</sub>.

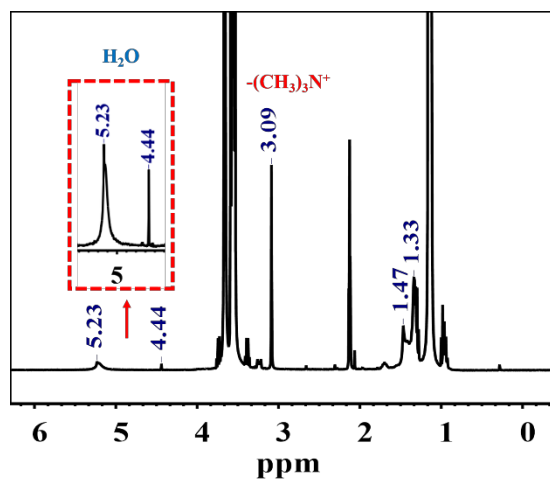
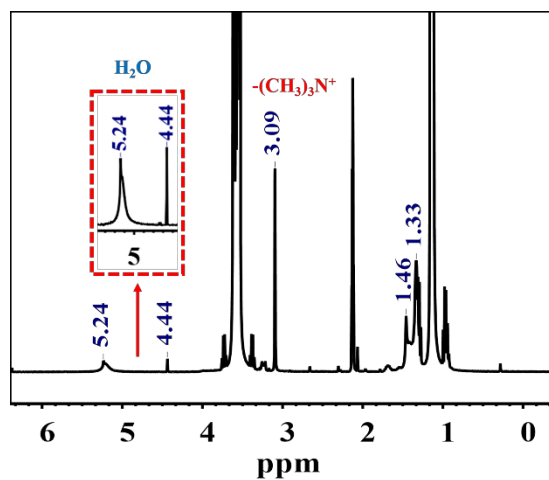
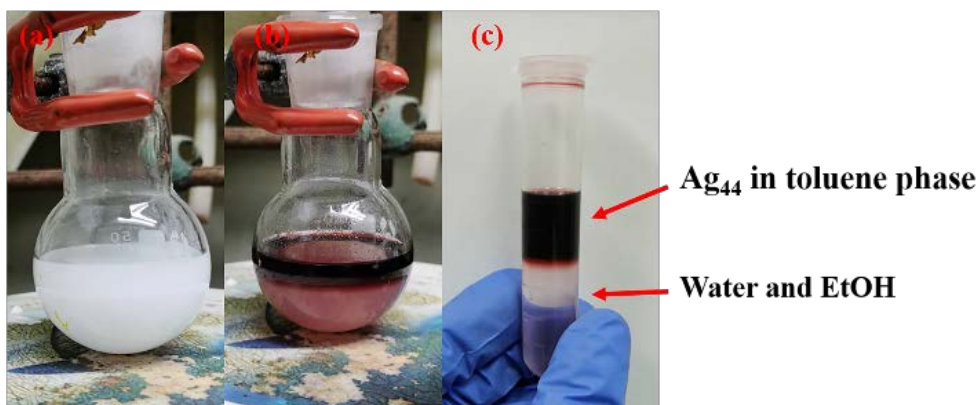


Figure S7 <sup>1</sup>H NMR spectrum of toluene-d<sub>8</sub> phase before adding the reductant during the synthesis of Ag<sub>44</sub> NCs.



**Figure S8**  $^1\text{H}$  NMR spectrum of toluene- $d_3$  phase after adding reductant 30 min in the synthesis of  $\text{Ag}_{44}$  NCs.



**Figure S9.** The photograph before adding the reducing agent (a) after adding reductant for 15 mins (b) after standing (c) in the process of  $\text{Ag}_{44}$  NCs synthesis by reverse micelle method.