Supplementary Material (ESI) for Journal of Materials Chemistry
This journal is (c) The Royal Society of Chemistry 2009

# Highly selective iodide-responsive gel-sol state transition in supramolecular hydrogels

Jiang-Shan Shen, Dong-Hua Li, Qing-Guo Cai and Yun-Bao Jiang*

*Department of Chemistry, College of Chemistry and Chemical Engineering, and the MOE Key Laboratory of Ananlytical Sciences, Xiamen University, Xiamen 361005, China*

*Fax: (+86)592-218-5662; Tel: (+86)592-218-5662; E-mail: ybjiang@xmu.edu.cn*

## Electronic Supplementary Information (ESI)

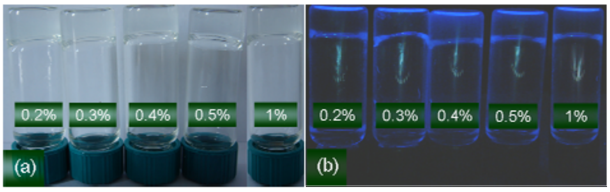


**Fig. S1** Photos of the hydrogels of varying Ag(I)-GSH content (wt) under (a) room light and (b) 354 nm UV-light

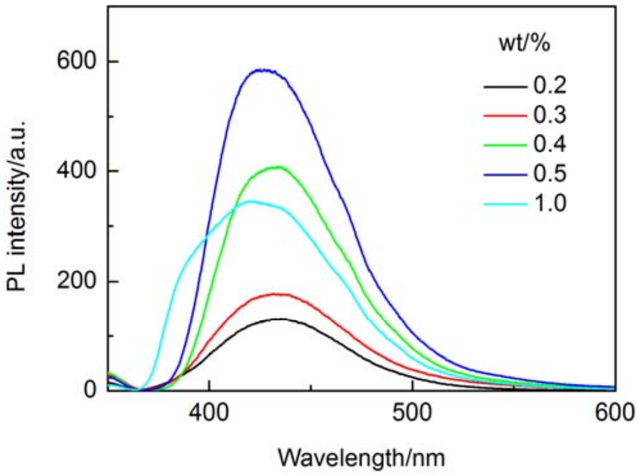


**Fig. S2** PL spectra of hydrogels of varying Ag(I)-GSH content (wt). $\lambda_{ex}$ = 350 nm.

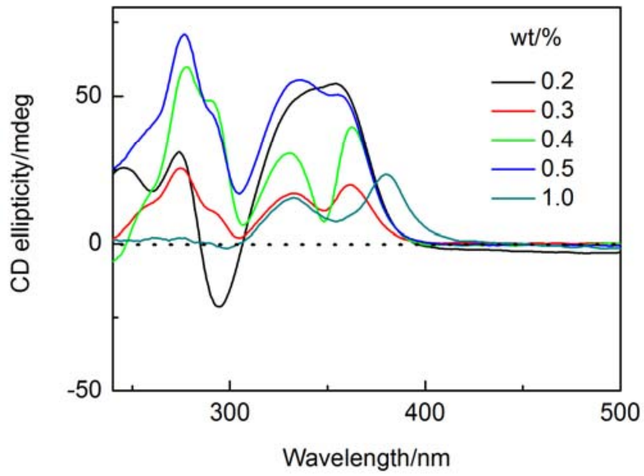


**Fig. S3** CD spectra of hydrogels of varying Ag(I)-GSH content (wt)

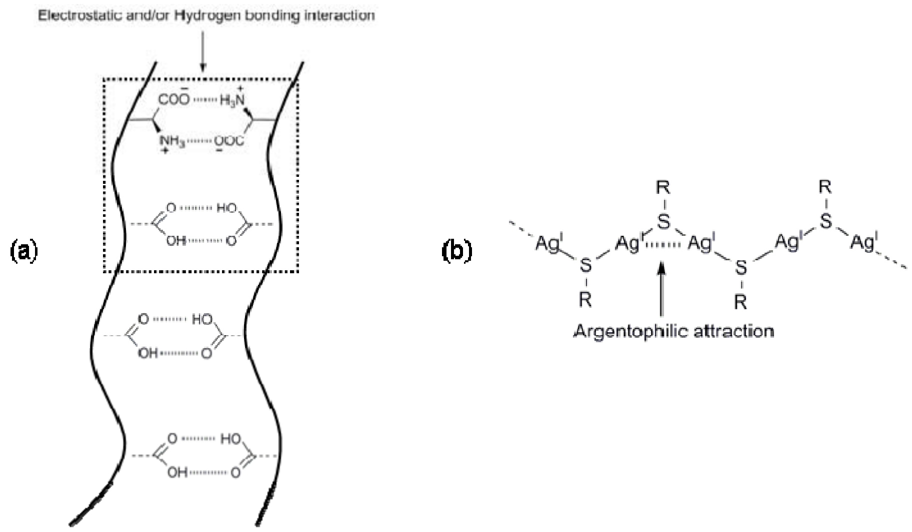


**Fig. S4** Illustration of synergistic interactions involving metallophilic attraction, electrostatic interaction, and/or hydrogen bonding in Ag(I)-GSH hydrogel. This was suggested responsible for gelation. (a) Hydrogen bonding and/or electrostatic interaction between polymeric chains. It should be noted that the isoelectric point of GSH is 3.8 and pH of the hydrogels is *ca*. 2, electrostatic interaction, and/or hydrogen bonding between polymeric chains can therefore be reasonably suggested.[1] (b) Argentophilic attraction between neighboring Ag(I)s in coordination polymeric backbone.

1. I. -I. S. Lim, D. Mott, W. Ip, P. N. Njoki, Y. Pan, S. Zhou and C. -J. Zhong, *Langmuir*, 2008, **24**, 8857-8863; A. Kühnle, T. R. Linderoth, B. Hammer and F. Besenbacher, *Nature*, 2002, **415**, 891-893; I-I. S. Lim, D. Mott, M. H. Engelhard, Y. Pan, S. Kamodia, J. Luo, P. N. Njoki, S. Zhou, L. Wang and C. J. Zhong, *Anal. Chem.*, 2009, **81**, 689-698; S. I. Lim and C. -J. Zhong, *Acc. Chem. Res.*, 2009, doi:10.1021/ar8002688.

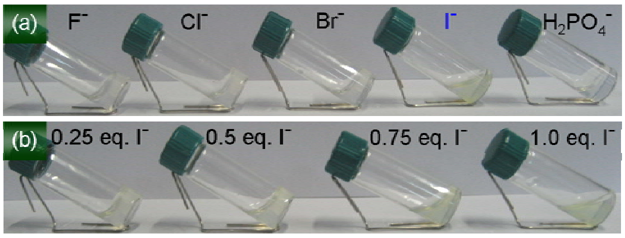


**Fig. S5** (a) Visual observation of response of Ag(I)-GSH hydrogel to various anions (1 eq.) and (b) gel-sol state transition of Ag(I)-GSH hydrogel triggered by 0.25, 0.5, 0.75, and 1.0 eq. $I^-$. The employed hydrogel contained 0.5 % Ag(I)-GSH (wt).

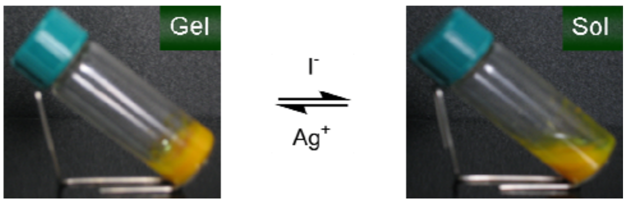


**Fig. S6** Visual observation of reversible gel-sol state transition of the hydrogel containing 0.5 % Ag(I)-GSH (wt) in a colored and fluorescent background containing fluorescein by alternately adding 1 eq. $I^-$ into hydrogel and 1 eq. Ag(I) into the resulting sol solution

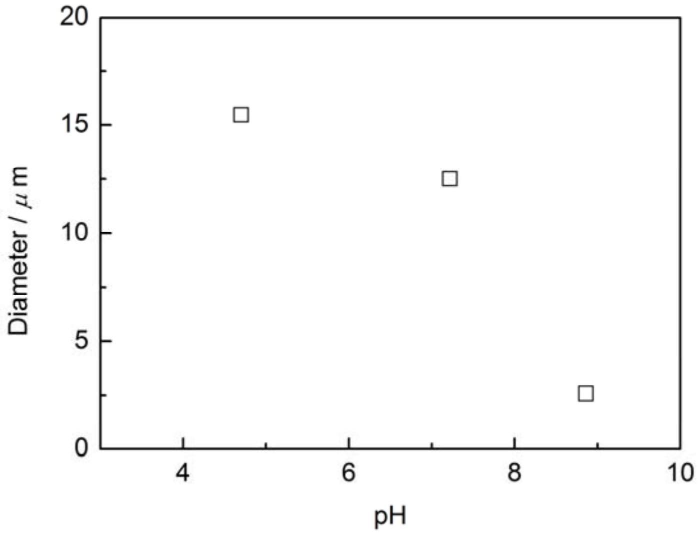


**Fig. S7** Mean hydrodynamic diameter ($D_h$) of Ag(I)-GSH bulk solution (75 μM) under different pH obtained from dynamic light scattering (DLS) measurements. Results indicated that electrostatic repulsion between Ag(I)-GSH polymeric chains occurred at high pH.

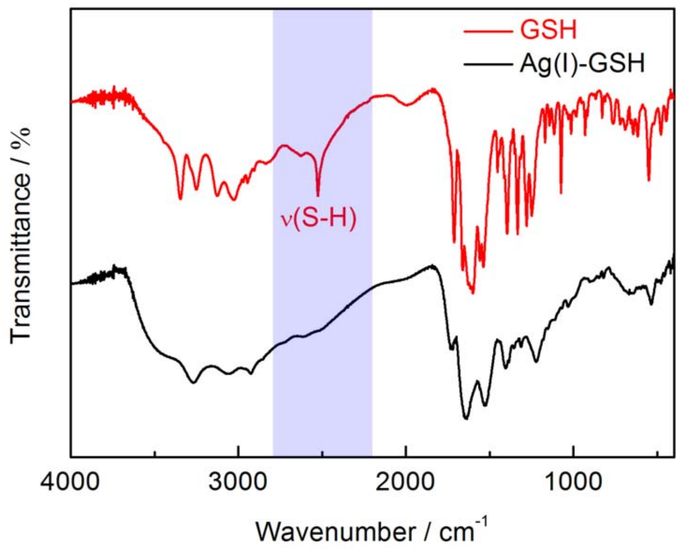


**Fig. S8** IR spectra of GSH (red) and Ag(I)-GSH xerogel (black) in KBr pellet. IR data clearly indicated that the prominent stretching band of S-H of GSH at 2555 $cm^{-1}$ disappeared in Ag(I)-GSH xerogel, in agreement with the formation of Ag(I)-thiolate. Both IR and DLS data pointed to the formation of Ag(I)-GSH structural unit.