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

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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.

**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 $\mu$M) 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.