Electronic Supplementary Material (ESI) for Soft Matter.

Supporting information

for

Injectable supramolecular hydrogel hybridized with silver nanoparticles for antibacterial application

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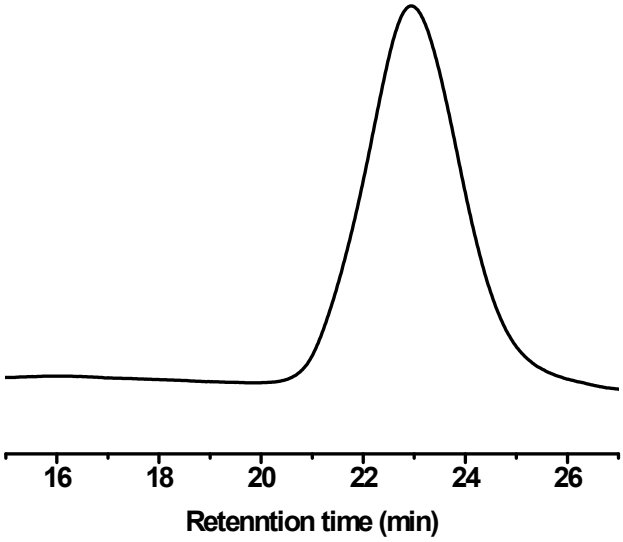

Figure S1. GPC traces of PPEGMA-*ran*-PAA.

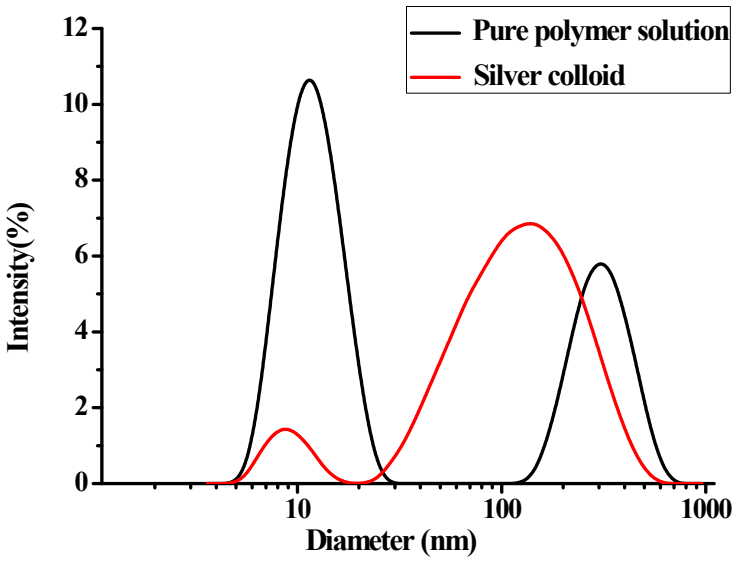

Figure S2. The size distribution of the pure PPEGMA-*ran*-PAA copolymer solution and the PEGylated silver nanoparticle colloid solution tested by DLS.

Particle size distribution of pure polymer solution and silver colloid was analysed by DLS (Zetasizer Nano ZS, Malvern) at a scattering angle of 90 º at 25 ºC. The polymer concentration was kept at 0.6 mg/mL for both pure PPEGMA-*ran*-PAA copolymer and the PEGylated AgNPs colloids solution. Three consecutive determinations per sample ensure uniform dispersion of the sample.

As shown in Figure S2, the size of the PPEGMA-*ran*-PAA copolymers in water solution was separated into two size, one with diameter of 11 nm, while the other with diameter of 300 nm. Due to the water solubility of PAA and PEGMA, the polymer was dissolved in water, and the size at 11 nm was corresponding to the size of the single PPEGMA-*ran*-PAA macromolecule in water. As there was hydrogen interaction between acrylic acid groups, the PAA section might be aggregated to form a loose core while the more hydrophilic PEGMA chains formed the shell, and thus form a core-shell structure self-assembly with the size of 300 nm as characterized from DLS. However, by stabilizing with Ag *in situ*, the inorganic Ag should form hydrophobic core while the PPEGMA-*ran*-PAA copolymer form hydrophilic shell to stabilize the metal core. The resultant AgNPs colloid showed a diameter of ca. 140 nm, which is smaller than that without Ag. The smaller size might be related to the tight Ag core of the self-assembly. In addition, the intensity of the single

macromolecules at 10 nm was much decreased after the complexation of Ag metal in the colloids.

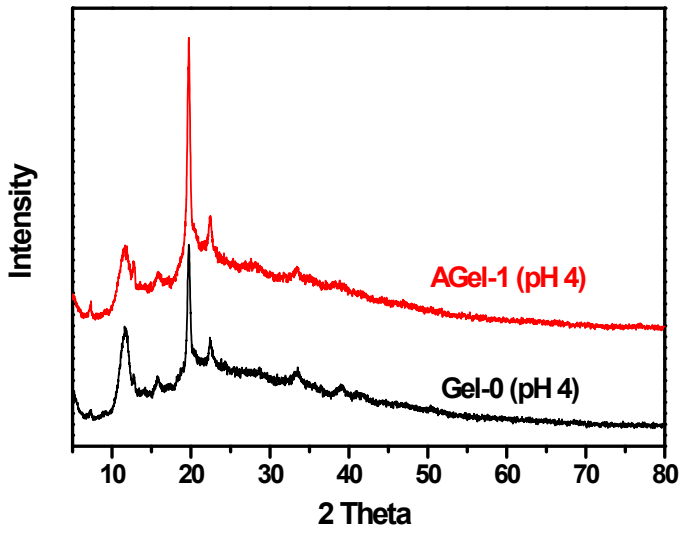

Figure S3. XRD patterns of freeze dried AgNPs hybrid hydrogel (upper) and blank hydrogel (lower) at pH 4.

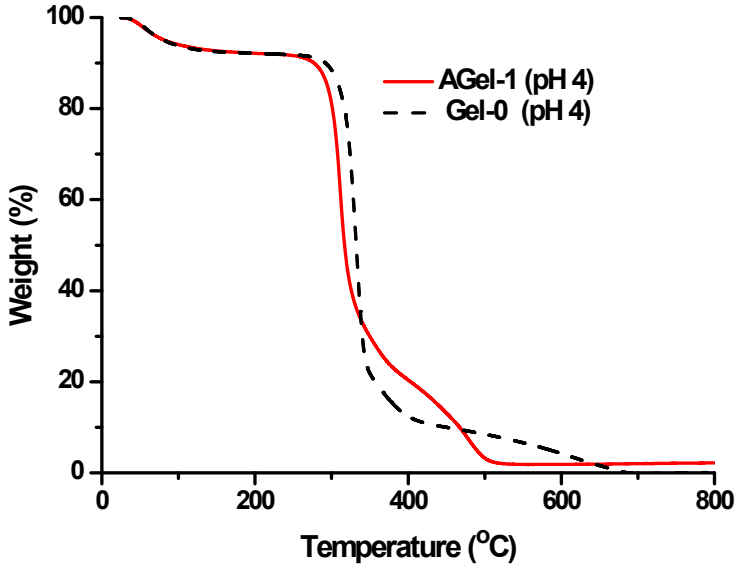

Figure S4. TGA traces of freeze dried AgNPs hydrogel (solid) and blank hydrogel (dash) at pH 4.

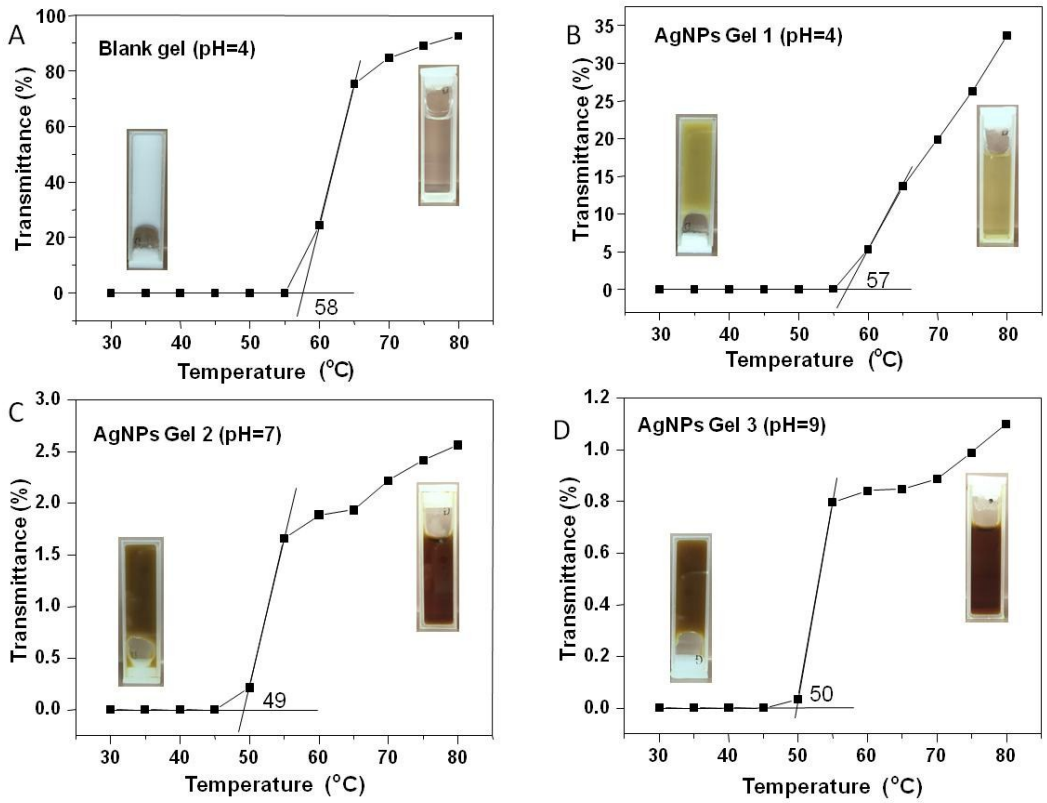

Figure S5. UV-vis transmittance of (A) blank hydrogel at pH 4 (Gel-0), (B) AgNPs hybride hydrogel at pH 4 (AGel-1), (C) AgNPs hybride hydrogel at pH 7 (AGel-2) and (D) AgNPs hybride hydrogel at pH 9 (AGel-3).

Figure S6. The picture of injected AGel-2 under forces.