Supporting Information

A fine-tuned thermosensitive hydrogel for wound reparation via phase transition enabling excellent antibacterial activity

Zhaoyuan Guo [a, b], Xiaoli Jiang [a], Yagang Zhang [a, *], Yabin Zhu [b, *]

[a] School of Materials and Energy, University of Electronic Science and Technology of China, Chengdu, 611731, PR China

[b] Ningbo Baoting Biotechnology Co., Ltd, Ningbo, 315105, PR China

* E-mails of corresponding authors: Dr. Yagang Zhang, ygzhang@uestc.edu.cn; Dr. Yabin Zhu, zhuyabin@nbu.edu.cn

Mterial and methods

Characterization

Ultraviolet-visible light spectrophotometry (UV): The resonance absorption peak of the prepared nano-silver was determined on UV-vis spectroscopy (Hitachi U-3900). After diluting the nano-silver dispersion, the absorption in the range of wavelength 300 - 700nm was recorded.

Dynamic light scattering (DLS): The size and distribution of AgNPs and micelles were measured by a dynamic light scattering instrument (MalvernZetasizer NanoZS). The light scattering angle was set to 90°. According to the Strokes-Einstein equation, the hydrodynamic diameter (Dh) and size distribution of the particles were calculated.

Transmission electron microscope (TEM): The microscopic image of the nano-silver particles and micelles were obtained by TEM (Tecnai G2 F20 S-TWIN). The samples solution (0.05%, wt) was dropped on a copper grid coated with a thin carbon film, and the observation was performed under an acceleration voltage of 100kV.

^1H NMR: A 400MHz proton nuclear magnetic resonance spectrometer (Bruker AV-400 spectrometer) was used to analyze the chemical structure of the copolymer. Deuterated chloroform ($CDCl_3$) was used as the solvent, and tetramethylsilane (TMS) was used as the internal standard. The chemical composition and molecular weight of the synthesized copolymer were determined according to the theory that the ratio of the amount of hydrogen atom substances in each assigned peak is equal to the ratio of the integrated area of each assigned peak.

X-ray diffraction (XRD): XRD analysis was performed on a diffractometer (Shimadzu XRD-6000) equipped with a Cu Kα radiation source. The voltage is set to 40 kV and the current is fixed to 40 mA. The diffraction patterns of a scan range between 5° to 50° were recorded with a scanning rate of 5°/min at room temperature.

RESULTS AND DISCUSSION

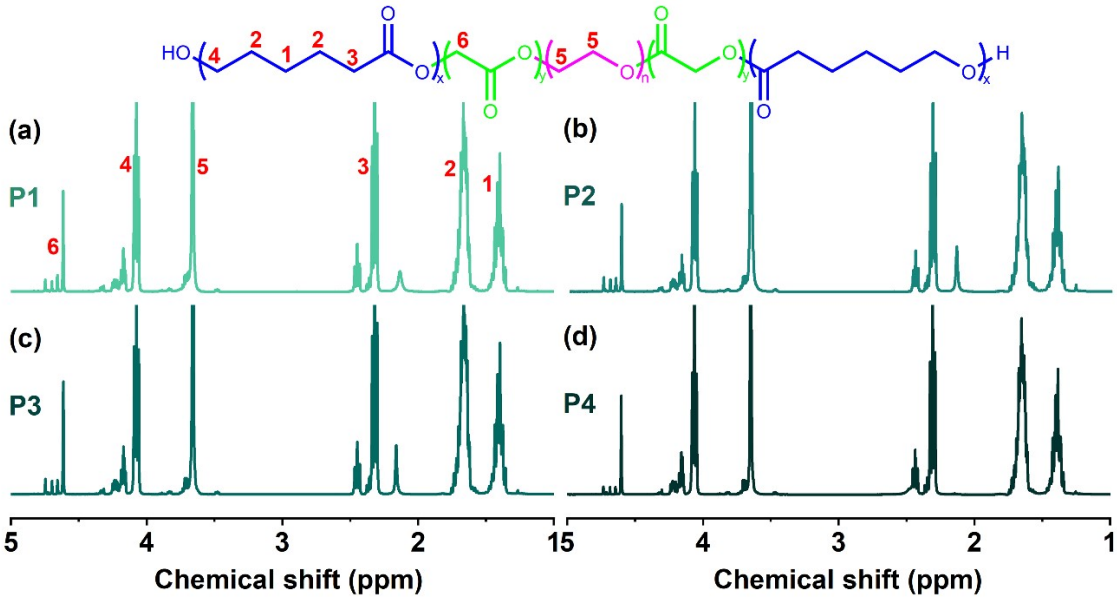

Fig. S1. ^{1}H NMR spectra of PCGA-PEG-PCGA copolymers in $CDCl_3$.

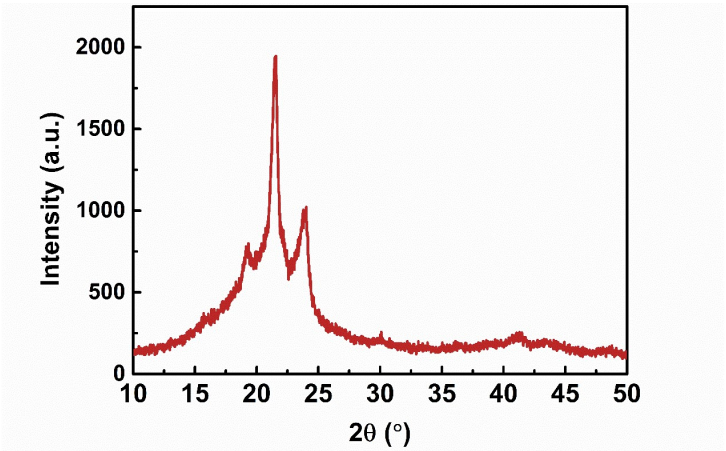

Fig. S2. XRD patterns of the PCGA-PEG-PCGA copolymers.

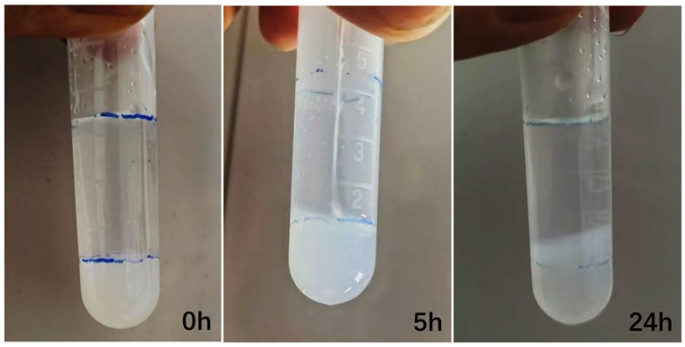

Fig. S3. Swelling behavior of the P4 hydrogel (Gel).

Table S1. Molecular weights of P4 after *in vitro* degradation

	M_n[a]	M_n[b]	M_w[b]	(M_w/M_n)[b]
1h	5500	6996	10222	1.46
3h	5650	6774	9836	1.45
6h	5500	7085	10139	1.43
10h	5500	7088	10144	1.43
24h	5600	6976	10064	1.44
48h	5500	6976	10057	1.44

[a] The M_n were calculated by ^{1}H NMR.

[b] Measured by GPC, relative to polystyrene standards.

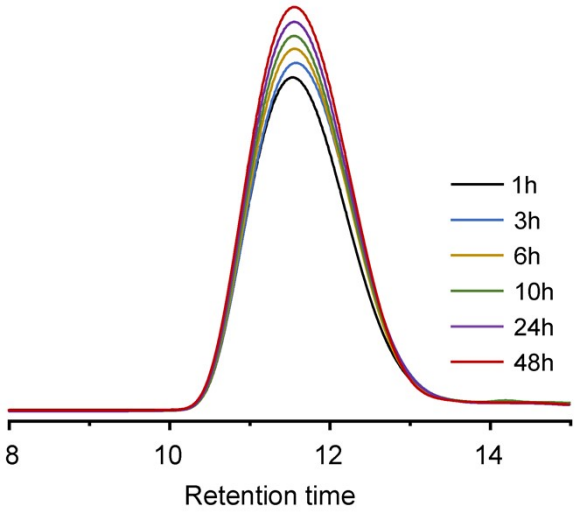

Fig. S4. The GPC spectra of P4 after *in vitro* degradation

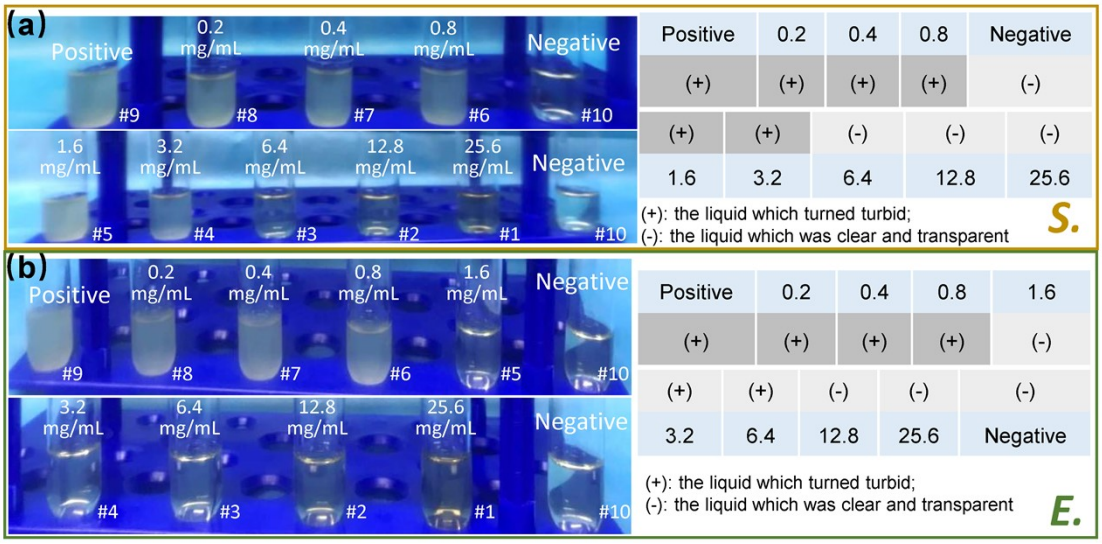

Fig. S5. The *S. aureus* (a) and *E. coli* (b) survival situation after treated with AgNPs.