

Supplementary Information

Near Infrared-sensitive Smart Windows from Au nanorods-Polymer Hybrid Photonic Hydrogels

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Supplementary Information mainly shows the following contents.

1. The characterization of PS spheres, PEG-thiol and Au nanorods (**Fig. S1**)
2. The characterization of hybrid photonic hydrogel (**Fig. S2**)
3. Optical images and reflection spectra of the hybrid photonic hydrogels (**Fig. S3**)
4. The Light-to-heat conversion efficiency of Au nanorods (**Fig. S4**)
5. The characterization of P(NIPAm-*co*-AAm) hydrogel (**Fig. S4** and **S5**)
6. Optical images of smart window in different conditions (**Fig. S6** and **S7**)
7. Videos of the NIR light response process of hybrid hydrogels (**Video 1-4**)

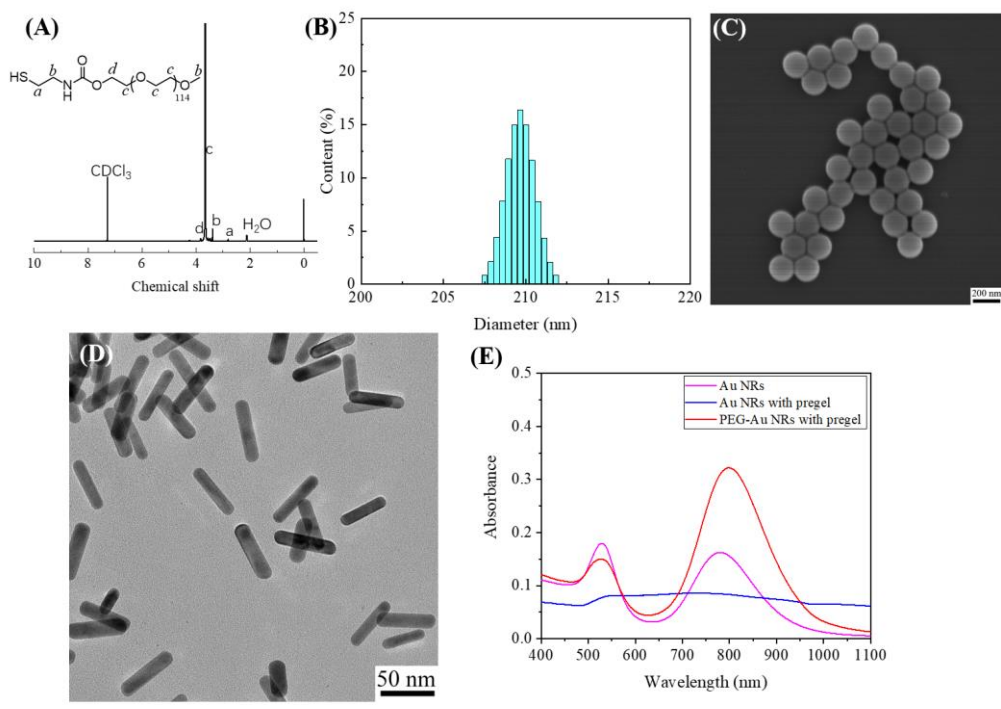


Fig. S1 (A) ^1H NMR spectrum of thiols terminal poly (ethylene glycol) (PEG-SH), indicating PEG-SH was successfully synthesized. (B) Particle size distribution of PS spheres in aqueous solution. (C) Typical SEM image of PS spheres. (D) TEM image of Au nanorods. (E) Absorption spectra of Au nanorods solutions in different conditions.

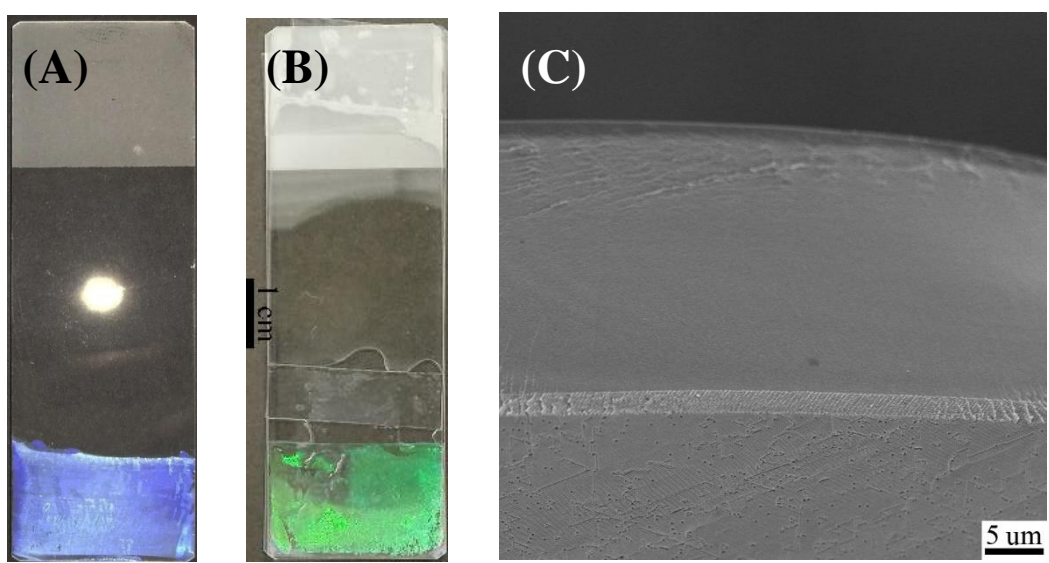


Fig. S2 The photographs of (A) photonic crystal and (B) NIR-sensitive hybrid photonic hydrogel.

(C) Section SEM image of NIR-sensitive hybrid photonic hydrogel.

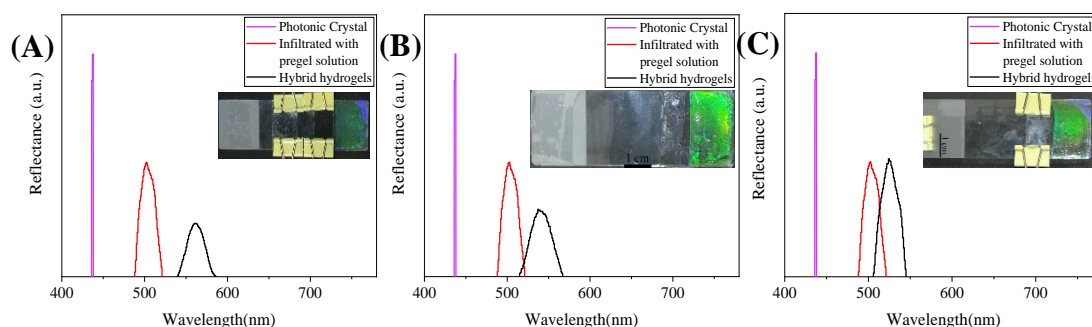


Fig. S3 Reflection spectra of different NIR-sensitive hybrid photonic hydrogels with different AAm contents: A) 10%, B) 15%, C) 20%. The insets are the photographs of hybrid photonic hydrogels after polymerization, indicating different AAm content NIR-sensitive hybrid photonic hydrogels were successfully synthesized.

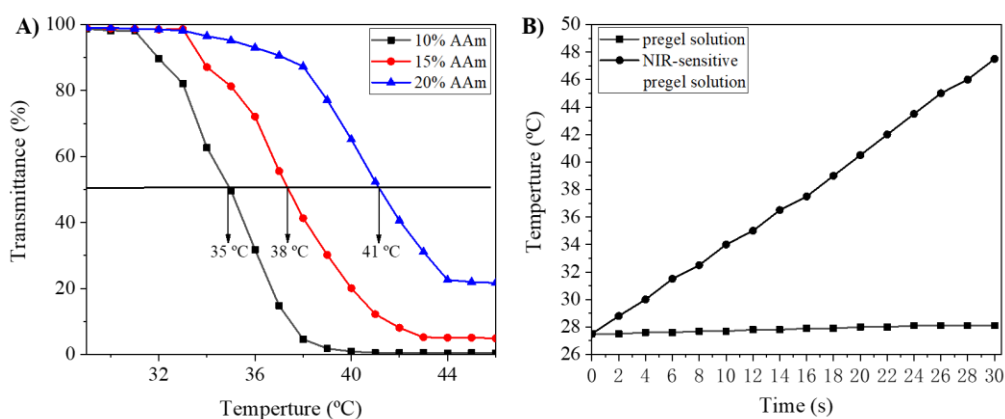


Fig. S4 (A) The transmittance of P(NIPAm-co-AAm) with different AAm contents (10%, 15% and 20%) at different temperatures, the lower critical solution temperature (LCST) of corresponding hydrogels are about 35 °C, 38 °C and 42 °C, respectively. (B) Plots of temperature as a function of irradiation time for pregel solution (NIPAm and AAm) and NIR-sensitive pregel solution (pregel solution with Au nanorods), indicating excellent photothermal conversion efficiency of Au nanorods.

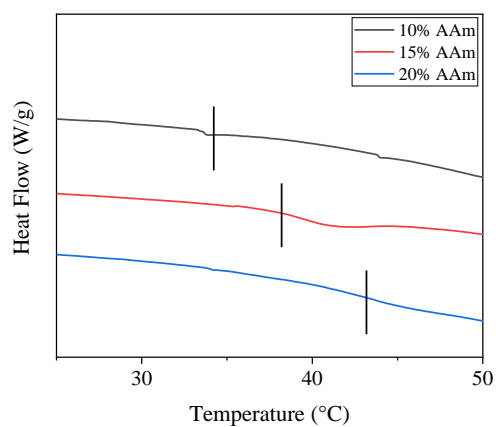


Fig. S5 DSC curves of P(NIPAm-co-AAm) hydrogel with different AAm contents (10%, 15% and 20%), the LCST of corresponding hydrogels are about 34.5 °C, 38 °C and 42.5 °C, respectively.

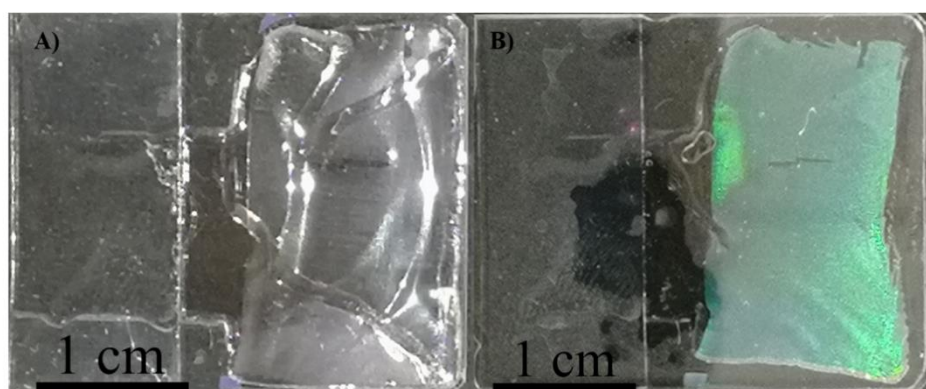


Fig. S6 Photographs of the hybrid photonic hydrogels (A) after drying and (B) infiltrated with water, showing the excellent reversibility of the NIR-sensitive hybrid photonic hydrogel.

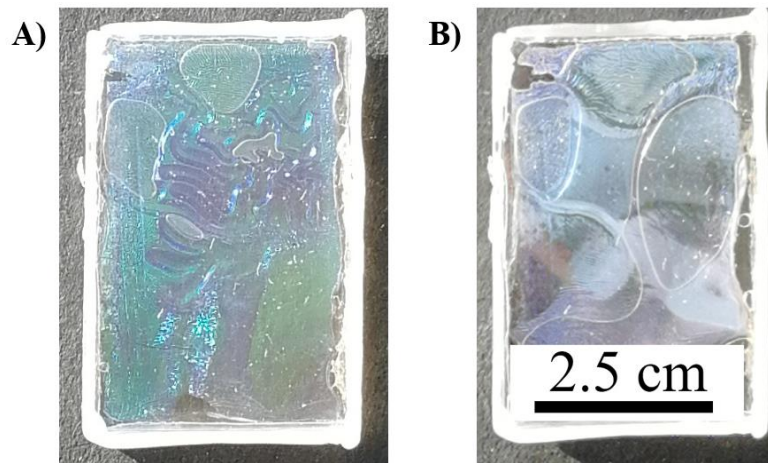


Fig. S7 Photographs of the smart window (A) before and (B) after 30 min of sun light radiation.

Video 1. NIR light response process of hybrid hydrogel (the amount of AAm was 10 mol%).

Video 2. NIR light response process of hybrid hydrogel (the amount of AAm was 15 mol%).

Video 3. NIR light response process of hybrid hydrogel (the amount of AAm was 20 mol%).

Video 4. NIR light response process of hydrogel based thermotropic smart window at the hundredth fatigue test (the amount of AAm was 10 mol%).