

Supporting Information

A Robust, Tough and Multifunctional Polyurethane/Tannic Acid Hydrogel by Physical-Chemical Dual Crosslinking

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2. Experiment Section

2.1. Determination of the water content in TA-PU hydrogels

The water content of as-prepared TA-PU hydrogels was calculated by the following formula:

$$WC = \frac{w_h - w_d}{w_h} \times 100\%$$

where w_h is the mass of as-prepared TA-PU hydrogel, w_d is the mass of corresponding dry gel.

The water content of TA-PU(S) hydrogels was obtained using the following formula:

$$WC = \frac{w_h - w_d}{w_h} \times 100\%$$

where w_h is the mass of TA-PU(S) hydrogel, w_d is the mass of corresponding dry gel.

2.2. Determination of the TA content in hydrogels

The TA content of as-prepared TA-PU hydrogel was calculated by the following formula:

$$TC = \frac{w_{TA}}{w_h} \times 100\% = \frac{w - w_0}{w_h} \times 100\%$$

where w_h is the mass of as-prepared PU-TAx hydrogel, w is the mass of corresponding dry gel. w_0 is the mass of porous dry gel before immersing in TA solution.

The TA content of PU-TAx(S) hydrogel was obtained using the following formula:

$$TC = \frac{w_{TA}}{w_h} \times 100\% = \frac{w - w_0}{w_h} \times 100\%$$

where w_h is the mass of PU-TAx(S) hydrogel, w is the mass of corresponding dry gel. w_0 is the mass of porous dry gel before immersing in TA solution.

2.3. Healing percentage of PU-TAx(S) hydrogels

Healing percentage of PU-TAx(S) hydrogels was obtained by the following formula:

$$\text{Healing Percentage (\%)} = \frac{\text{sample strength after healing (MPa)}}{\text{pristine sample strength (MPa)}} \times 100\%$$

2.4. Swelling ratio of PU-TAx(S) hydrogels

$$S = \frac{m_s - m_d}{m_d} \times 100\%$$

where m_d and m_s are the mass of dry and swollen samples, respectively.

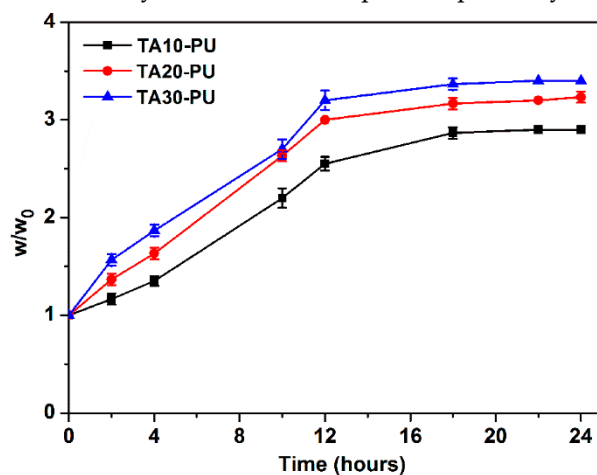


Figure S1. Variation of mass ratio with immersing time of porous PU hydrogels in different TA solutions. Error bars indicate standard deviation; N = 3.

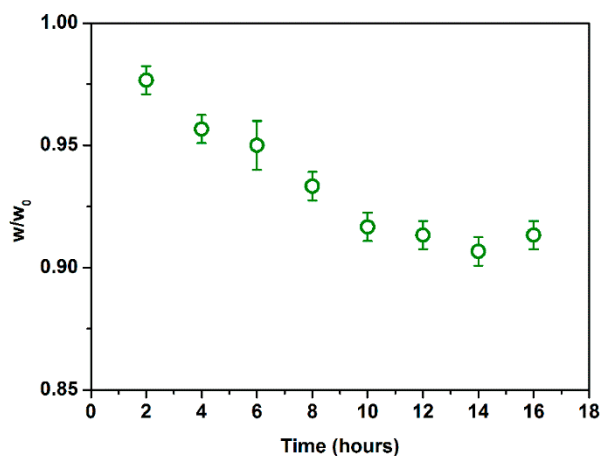


Figure S2. Variation of mass ratio with immersing time of porous TA10-PU hydrogel in distilled water. Error bars indicate standard deviation; N = 3.

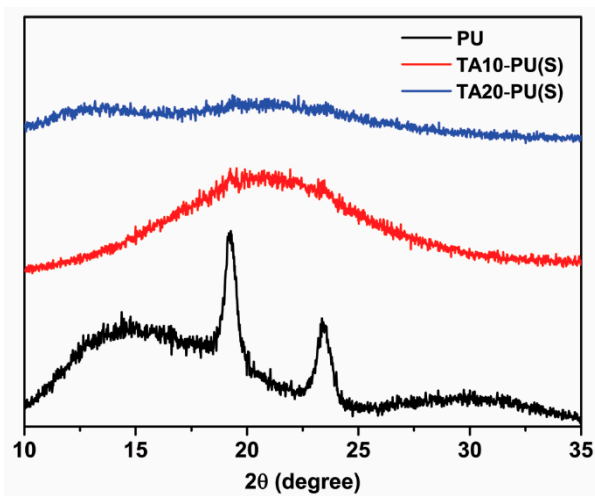


Figure S3. XRD graphs of PU and TAx-PU(S) dry gels.

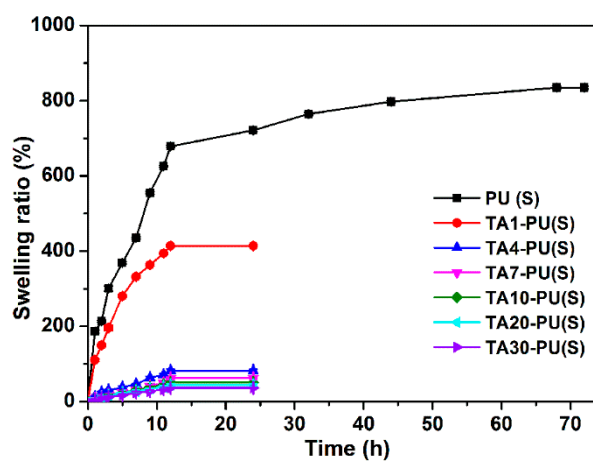


Figure S4. Swelling curves of PU(S) and TAx-PU(S) hydrogels.

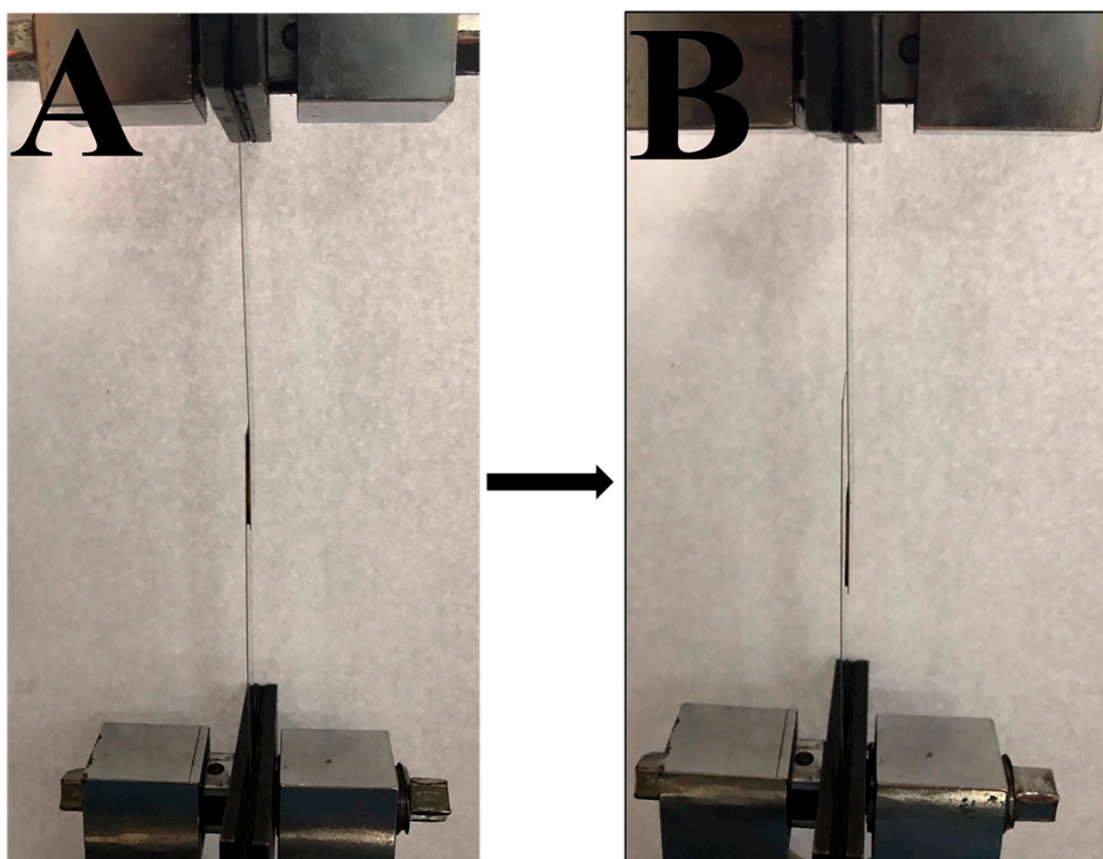


Figure S5. Images of adhesion test of TA30-PU(S) hydrogel.

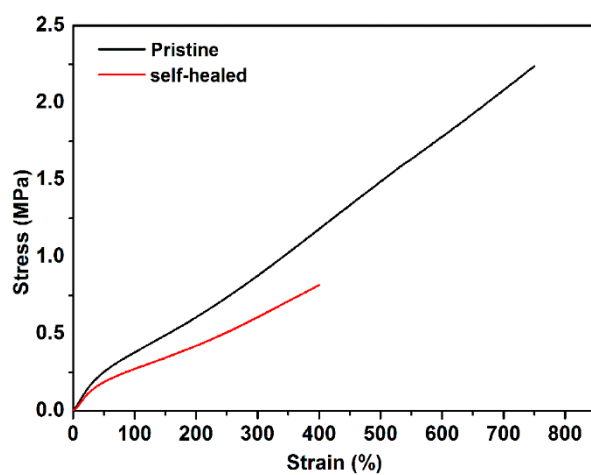


Figure S6. Tensile stress-strain curves of pristine and self-healed TA30-PU(S) hydrogels.



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