

## Supporting Information

### Green Fabrication of Hydrogel-Immobilized Au@Ag Nanoparticles Using Tannic Acid and Application in Catalysis

Hengxi He<sup>a,b</sup>, Didier Astruc<sup>c,\*</sup>, Haibin Gu<sup>a,b,\*</sup>

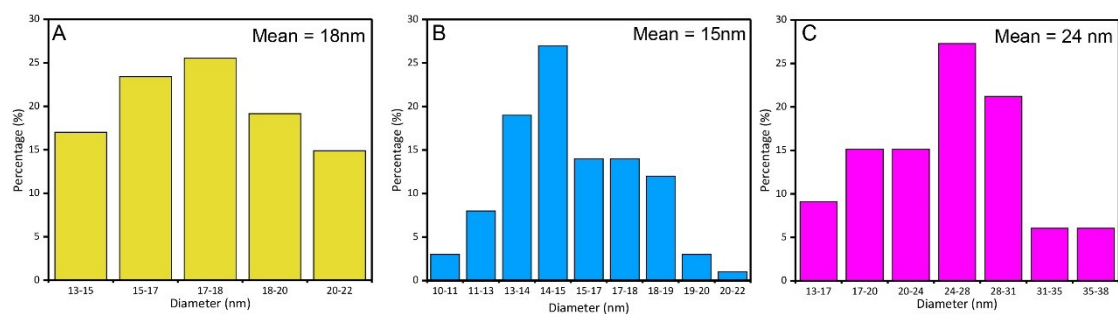
<sup>a</sup> Key Laboratory of Leather Chemistry and Engineering of Ministry of Education, Sichuan University, Chengdu 610065, China. E-mail: guhaibinkong@126.com (H. Gu)

<sup>b</sup> National Engineering Research Center of Clean Technology in Leather Industry, Sichuan University, Chengdu 610065, China.

<sup>c</sup> ISM, UMR CNRS No 5255, Univ. Bordeaux, 351 Cours de La Libération, 33405 Talence Cedex, France. didier.astruc@u-bordeaux.fr (D. Astruc)

#### Table of Contents

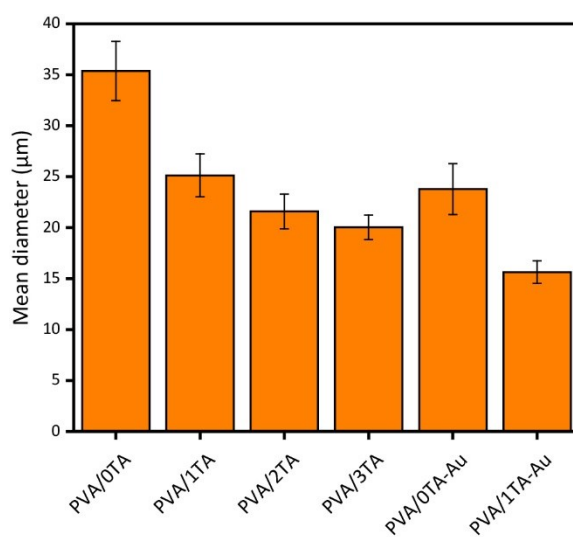
Figure S1. Diameter statistic of AuNPs, AgNPs, and Au@AgNPs	S2
Table S1. DLS results of three kinds of NPs	S2
Figure S2. The hole sizes of different PVA/TA hydrogels	S2
Figure S3. Tensile strength of PVA/0TA hydrogel, PVA/1TA hydrogel, PVA/2TA hydrogel, and PVA/3TA hydrogel	S3
Figure S4. Photographs of PVA+TA mixture without any treatment and treated with different repeated number freeze-thaw	S3
Figure S5. UV-vis. spectra of hydrogels soaking liquid after urea treated 72 h	S3
Figure S6. Original EDS mapping images of PVA/1TA-Au hydrogel and PVA/1TA-Au@Ag hydrogel	S4
Figure S7. UV-vis. spectrum of 2-NP aqueous solution	S4



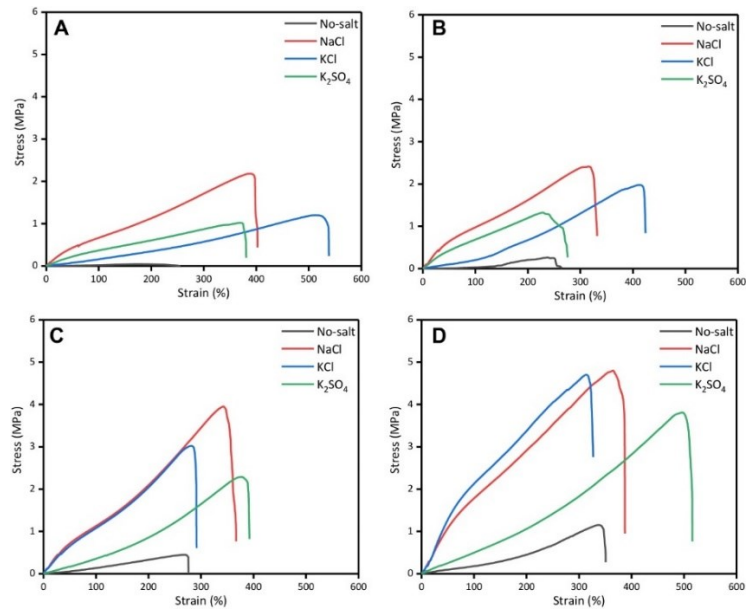
**Figure S1.** Diameter statistic of (A) AuNPs, (B) AgNPs, and (C) Au@AgNPs used Nano Measurer 1.2.

**Table S1.** DLS results of three kinds of NPs

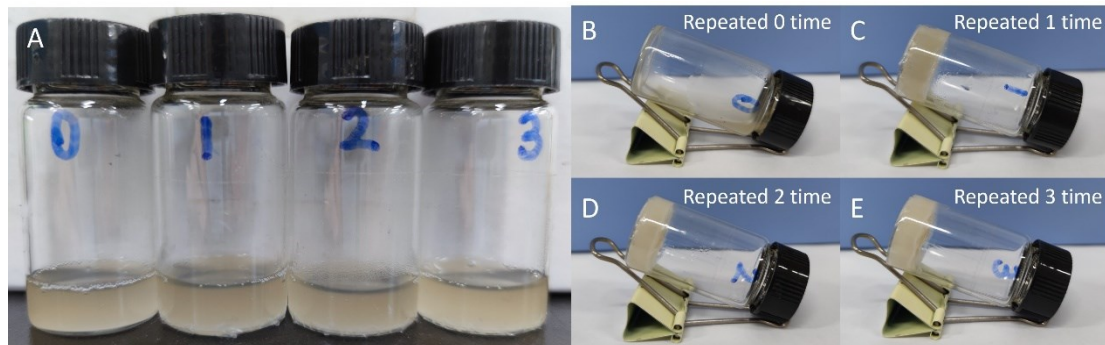
	Mean diameter (nm)	Zeta potential (mV)
AuNPs	21	-20.8
AgNPs	18	-30.1
Au@AgNPs	32	-23.2



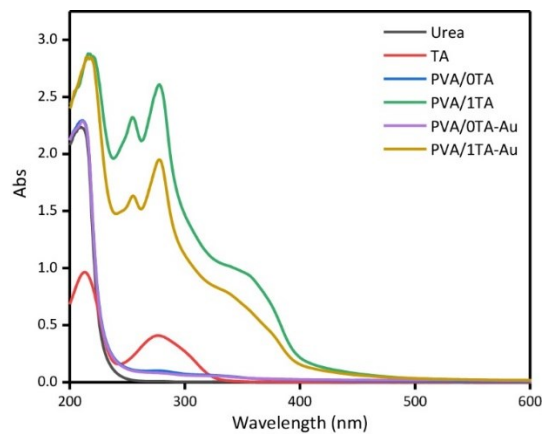
**Figure S2.** The hole sizes of different PVA/TA hydrogels.



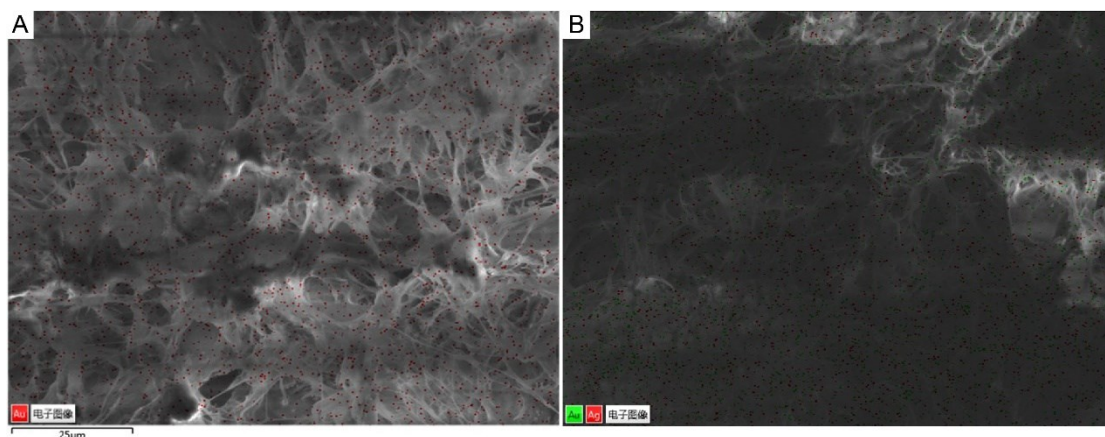
**Figure S3.** Tensile strength of (A) PVA/0TA hydrogel, (B) PVA/1TA hydrogel, (C) PVA/2TA hydrogel, and (D) PVA/3TA hydrogel after being soaked in different kinds of saturation salt solution.



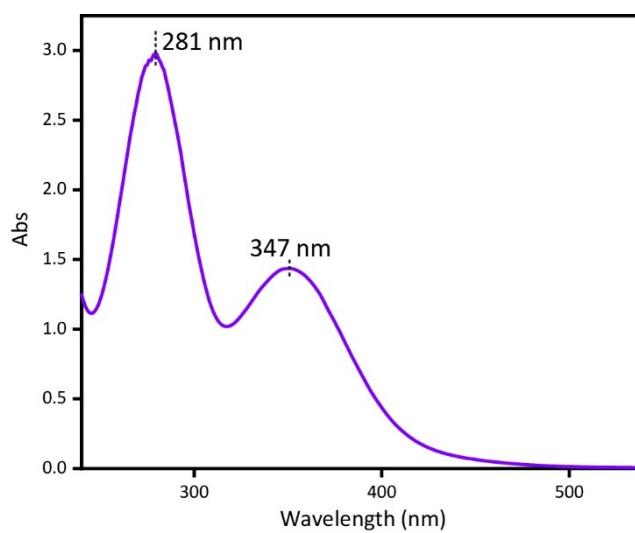
**Figure S4.** Photographs of A) PVA+TA mixture without any treatment and B-E) PVA+TA mixture treated with different repeated number freeze-thaw.



**Figure S5.** UV-vis. spectra of hydrogels soaking liquid after urea treated 72 h.



**Figure S6.** Original images of EDS mapping. (A) PVA/1TA-Au hydrogel and (B) PVA/1TA-Au@Ag hydrogel.



**Figure S7.** UV-vis. spectrum of 2-NP aqueous solution.