# Supporting Information

## 3D Printable Conductive Ionic Hydrogels with Self-adhesion Performance for Strain Sensing

Xiaoqin Zhang,[a] Shunshun Lin,[b] Liqiang Zhang,[a] Rui Guo,[a,c] Yaozhong Lu,[a] Sen Liu,[d] Zhiyong Su,[c] Zhongying Ji*,[a,c] and Xiaolong Wang*[a,c]

*a. State Key Laboratory of Solid Lubrication, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou 730000, China. E-mail: wangxl@licp.cas.cn; jizy@licp.cas.cn;*

*b. College of Food Science and Technology, Henan Agricultural University, Zhengzhou 450002, China;*

*c. Shandong Laboratory of Yantai Advanced Materials and Green Manufacturing, Yantai Zhongke Research Institute of Advanced Materials and Green Chemical Engineering, Yantai 264006, China;*

*d. School of Chemical Engineering, Northwest Minzu University, Lanzhou 730030, China;*

*Corresponding authors

E-mail address: jizy@licp.cas.cn (*Z.-Y, Ji*); wangxl@licp.cas.cn (*X.-L, Wang*).

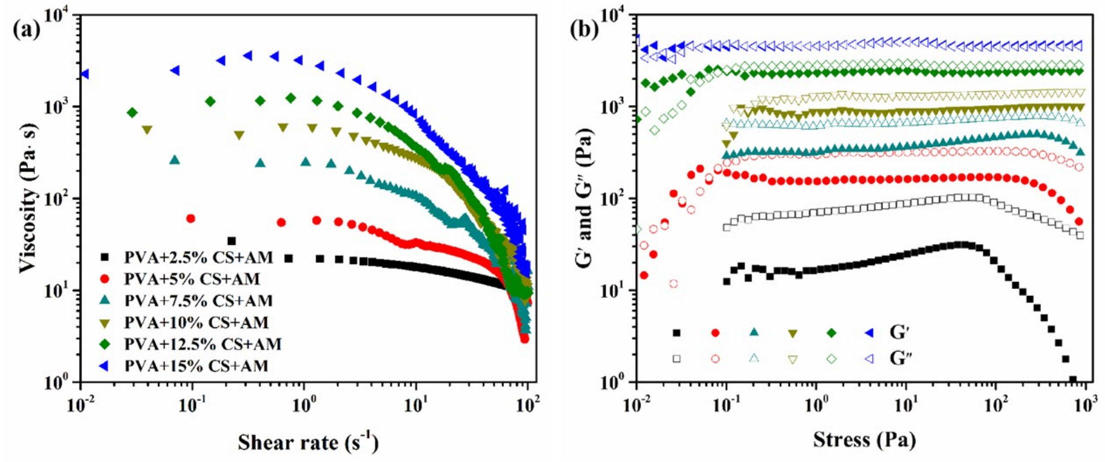


**Figure S1.** (a) The shear-thinning behavior and (b) the storage modulus (G') and loss modulus (G'') of the PVA-CS-AM hydrogel ink with different concentrations of CS.

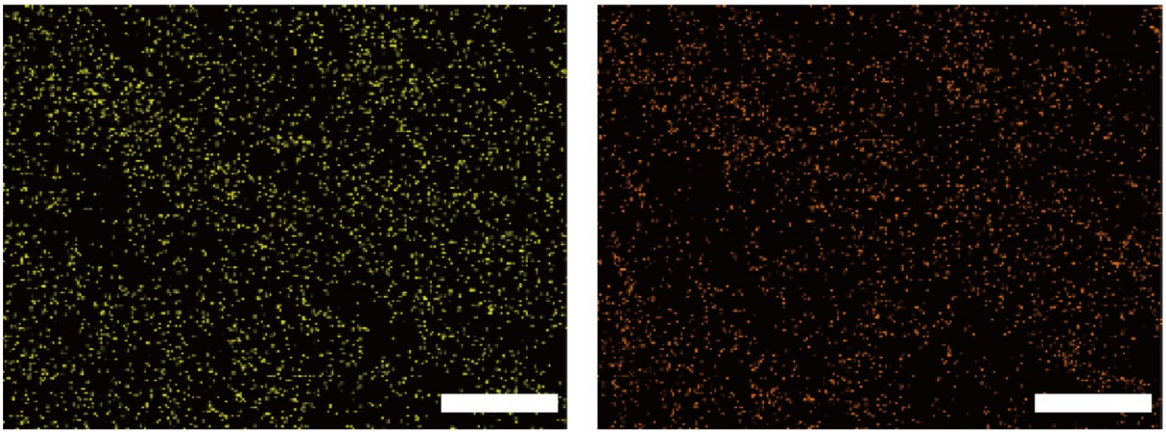

**Figure S2.** Na (left) and B (right) elements on the surface of freeze-dried ionic conductive hydrogel (scale bar is 50 μm).

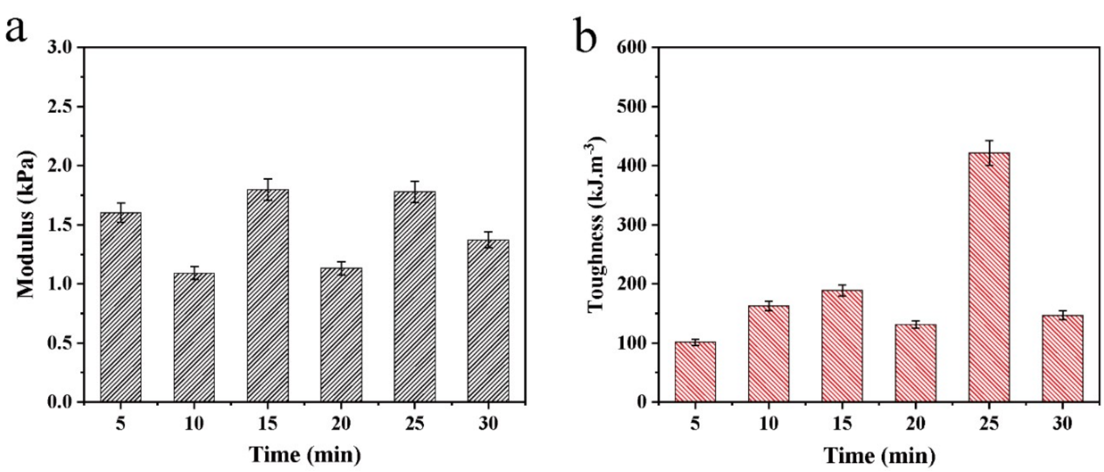


**Figure S3**. The modulus (a) and toughness (b) of PVA-CS-PAM hydrogels as function of soaking time in borax solution.

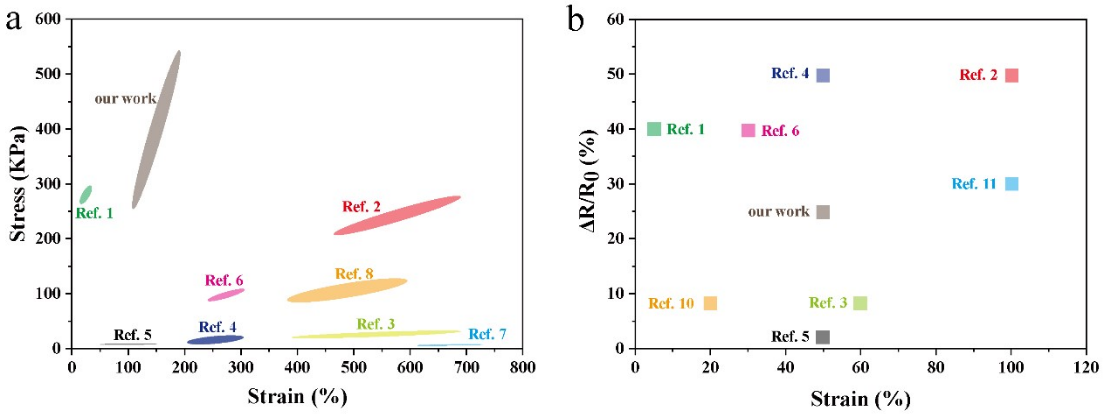


**Figure S4**. Comparison of mechanical property (a) and resistance changes (b) between our prepared ionic conductive hydrogels and the previous researches.

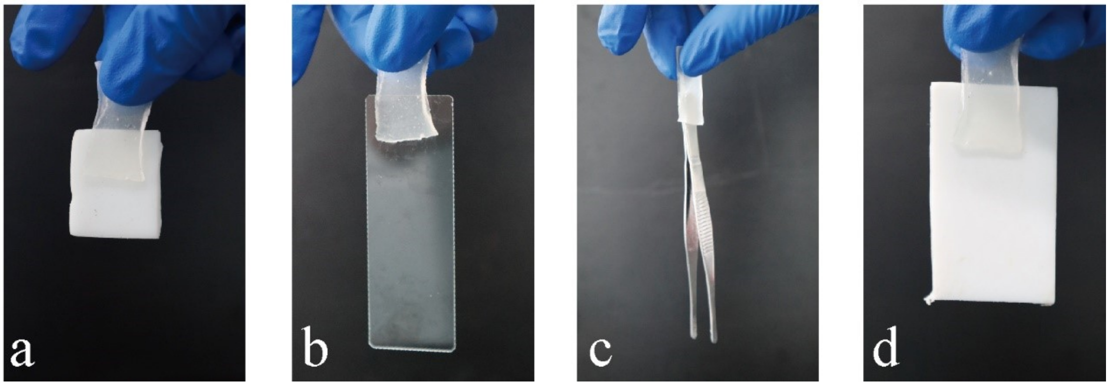


Figure S5. The hydrogel exhibits an excellent adhesion property by adhering to (a) general silicon rubber (TT630, Shenzhen Hong Ye Jie Technology Co., Ltd, Shenzhen, China; ~3.1 g), (b) glass slide (~5.02 g), (c) metal tweezer (~15.6 g), and (d) poly tetra fluoroethylene (PTFE) sheet (~22.2 g) with the contact area of ~ 1.0 $cm^2$.

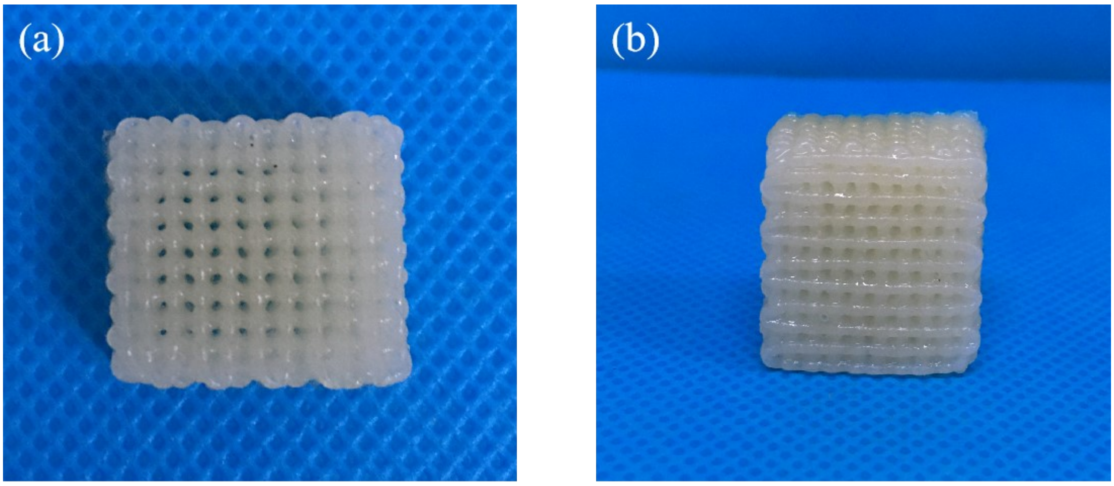


**Figure S6.** The 3D printed hydrogel cellular structure photos from (a) top and (b) front view.

**Video S1.** The self-healing property of PVA-CS-PAM hybrid hydrogel of the two fractured surfaces rapidly contact each other after the blade was removed.

**Video S2.** The self-healing property of PVA-CS-PAM hybrid hydrogel on a complete circuit composed of a LED indicator with hybrid hydrogel as the conductor.