Electronic supplementary information (ESI)

Ultra-Tough Injectable Cytocompatible Hydrogel for 3D Cell Culture and Cartilage Repair

Yanran Zhao[a], Mengnan Li[b], Bingchuan Liu[c], Junfeng Xiang[a,d], Zhiyong Cui[c], Xiaozhong Qu[a], Dong Qiu[b], Yun Tian[c]* and Zhenzhong Yang[b]**

[a] College of Materials Science and Opto-Electronic Technology, University of Chinese Academy of Sciences, Beijing 100049, China.

[b] State Key Laboratory of Polymer Physics and Chemistry, Institute of Chemistry, Chinese Academy of Sciences, Beijing 100190, China.

[c] Peking University Third Hospital, Beijing 100191, China.

[d] Center for Physicochemical Analysis and Measurement, Institute of Chemistry, Chinese Academy of Sciences, Beijing 100190, China.

Supplementary Figures

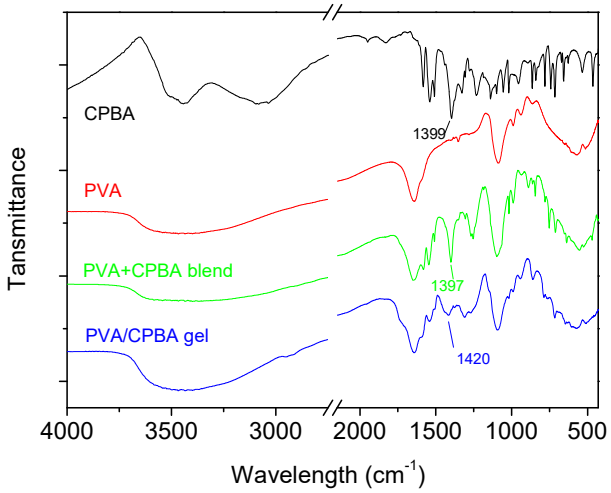

Figure S1. FTIR spectra of PVA, CPBA (sodium salt), blend of PVA and CPBA at 7/3 weight ratio, and freeze-dried PVA7/CPBA3 hydrogel.

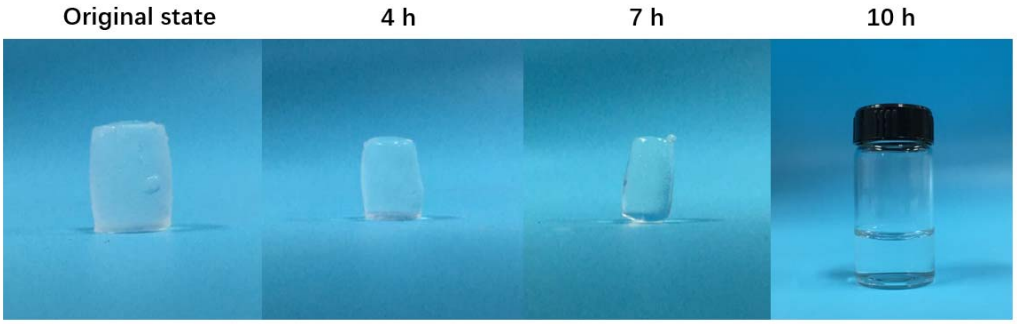

Figure S2. Digital images of PVA7/CPBA3/Ca4 hydrogel after being dialysized in 5 % glucose solution for various duration.

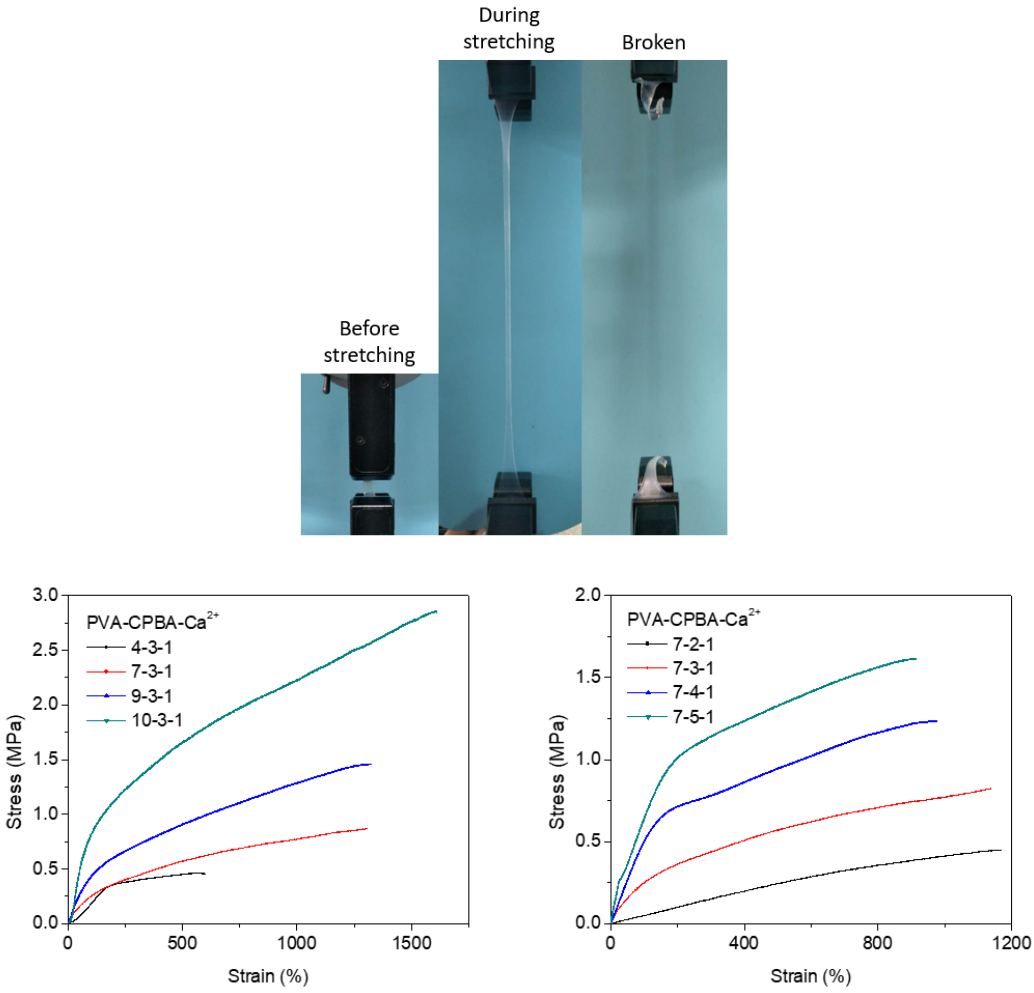

Figure S3. Photographs for demonstrating the tensile test an the stress-strain curves of the PVA/CPBA/Ca hydrogel samples with various chemical composition (wt% in hydrogel).

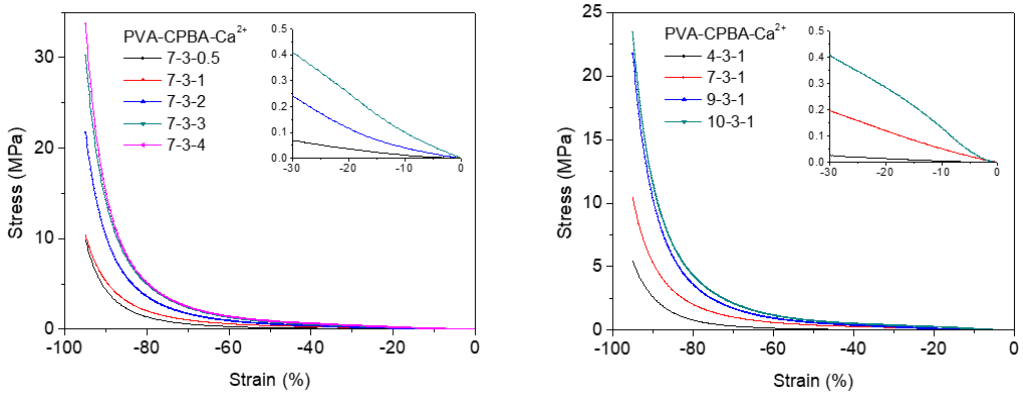

Figure S4. Compressive stress-strain curves of the PVA/CPBA/Ca hydrogel samples with various chemical composition (wt% in hydrogel).

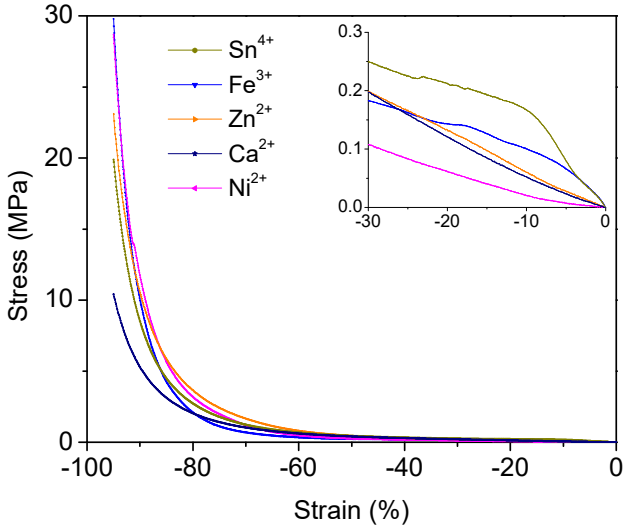

Figure S5. Compressive stress-strain curves of the PVA7/CPBA3 hydrogels containing different types of cations (1 wt%).

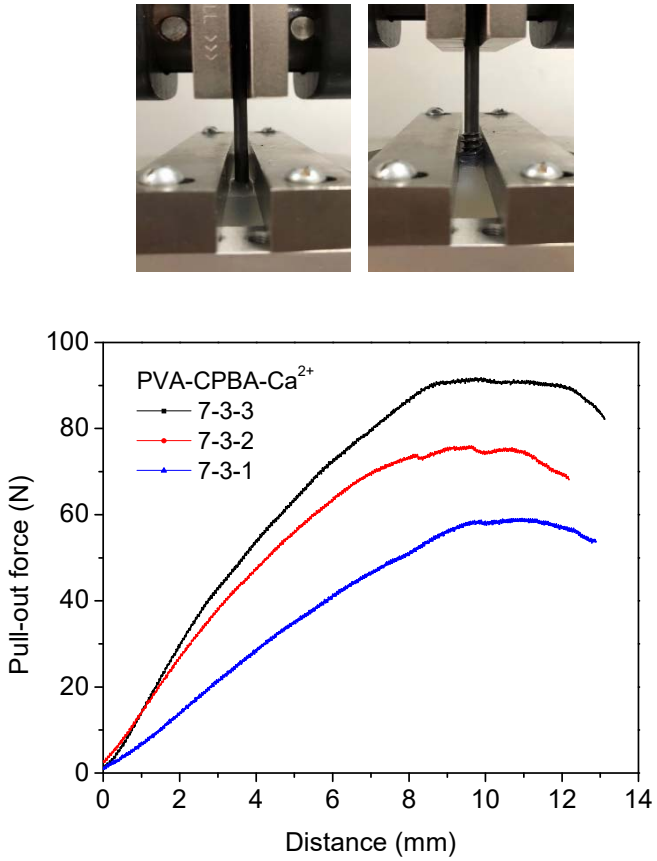

Figure S6. Photographs for demonstrating the pull-out test and the pull-out force of the screw from the PVA/CPBA/Ca hydrogels.

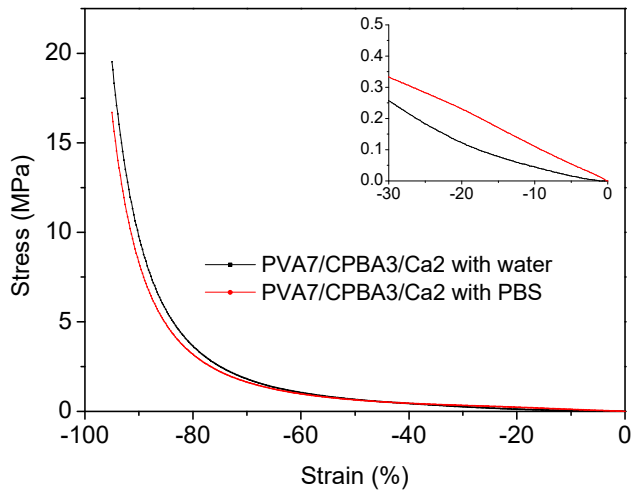

Figure S7. Comparison of the ionic strength in the aqueous phase of the PVA/CPBA/Ca hydrogel on its compressive behavior.

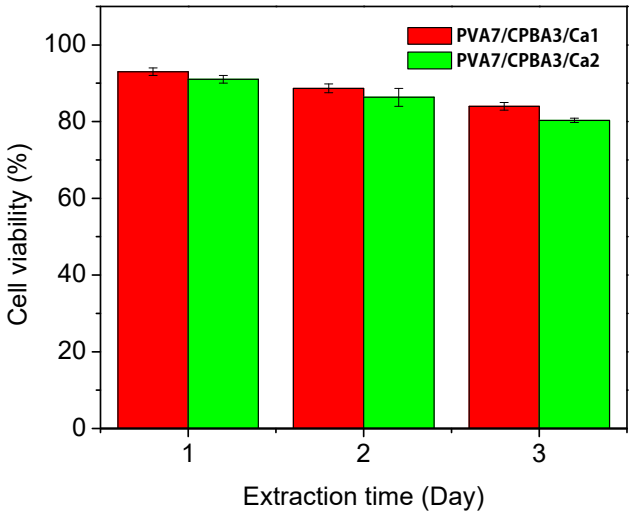

Figure S8 Cytotoxicity of leach liquor from the the PVA/CPBA/Ca hydrogels on L929 cell line.

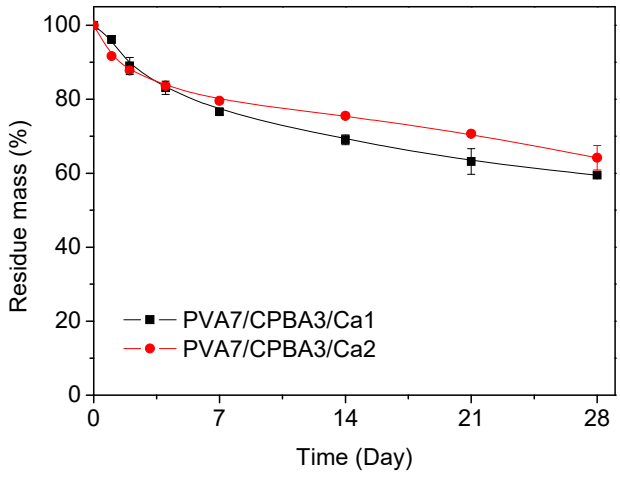

Figure S9. In vitro degradation of the PVA/CPBA/Ca hydrogels in water.

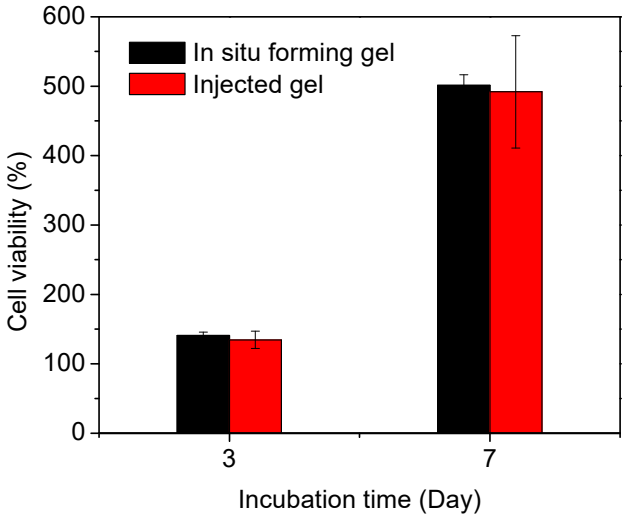

Figure S10. Comparison of processing methodology on the cell viability inside the PVA7/CPBA3/Ca1 hydrogel. The cell line is ATDC5. The statistics analysis show no significant difference between the two groups at each time point ($p > 0.05$).

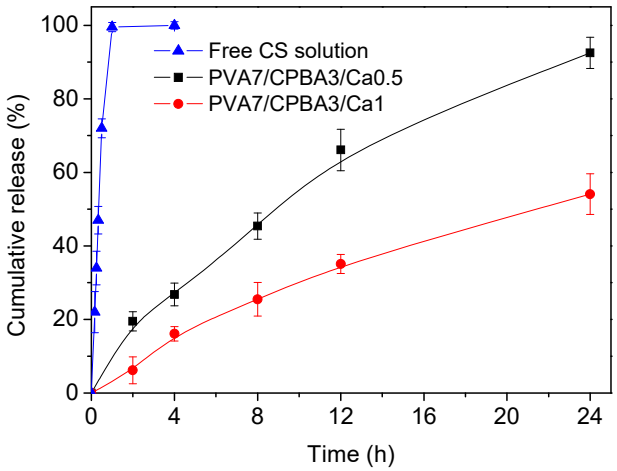

Figure S11. Cumulative release of chondroitin sulfate (CS) from the PVA/CPBA/Ca hydrogels. The loading ratio was 5 mg of CS in 1 mL of hydogel.