Science Advances
AAAS

advances.sciencemag.org/cgi/content/full/7/1/eabc5442/DC1

Supplementary Materials for

High-strength and fibrous capsule–resistant zwitterionic elastomers

Dianyu Dong, Caroline Tsao, Hsiang-Chieh Hung, Fanglian Yao, Chenjue Tang, Liqian Niu, Jinrong Ma, Joel MacArthur, Andrew Sinclair, Kan Wu, Priyesh Jain, Mitchell Ryan Hansen, Dorathy Ly, Sebastian Gia-huy Tang, Tammy My Luu, Parul Jain, Shaoyi Jiang*

*Corresponding author. Email: sjiang@uw.edu, sj19@cornell.edu

Published 1 January 2021, *Sci. Adv.* **7**, eabc5442 (2021)
DOI: 10.1126/sciadv.abc5442

The PDF file includes:

Other Supplementary Material for this manuscript includes the following:

(available at advances.sciencemag.org/cgi/content/full/7/1/eabc5442/DC1)

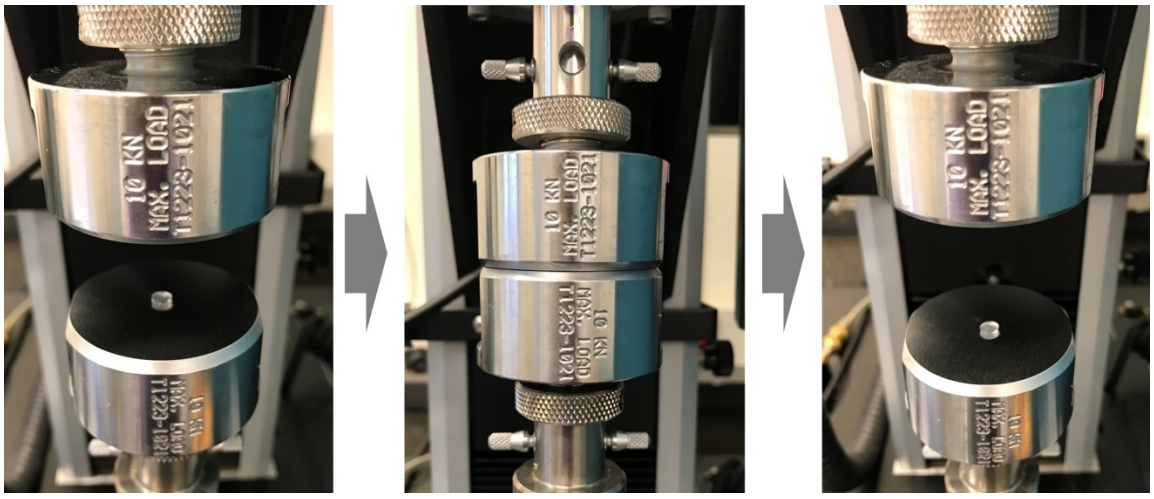

Fig. S1. Representative images of the pCB/pSB ZEN hydrogel disk under a universal uniaxial compressive test. The sample disk kept its original shape and appearance after being released from a compressive test to the testing limit of the tester when two anvils almost touched. Photo credit: D. Dong (University of Washington, Tianjin University).

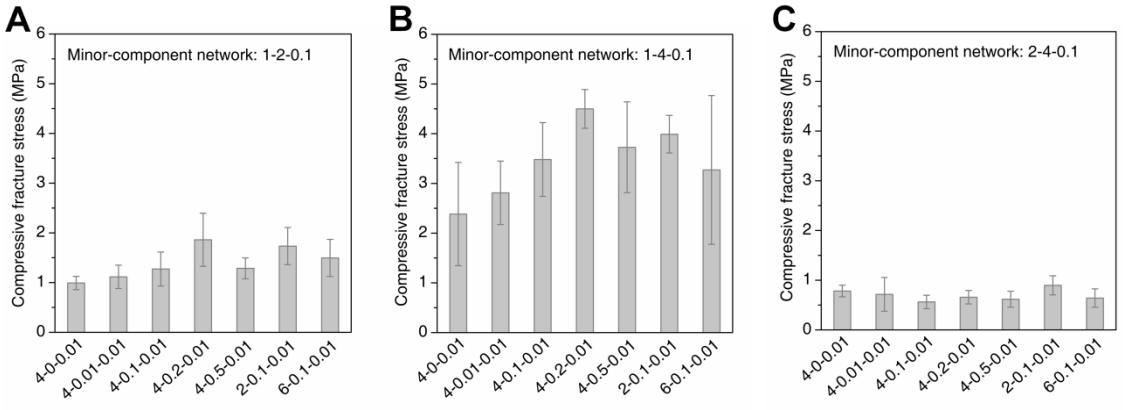

Fig. S2. Compressive fracture stress of a series of pCB/pCB [minor-component/major-component network] hydrogels. The minor-component networks were made according to the composition of (**A**) 1-2-0.1, (**B**) 1-4-0.1, and (**C**) 2-4-0.1, respectively. The major-component networks were made according to seven different compositions as indicated in the x-axis. Note that *x*, *y* and *z* for *x*-*y*-*z* represent the molar monomer concentration, crosslinker (mol% respect to monomer), and initiator concentration (mol% respect to monomer), respectively.

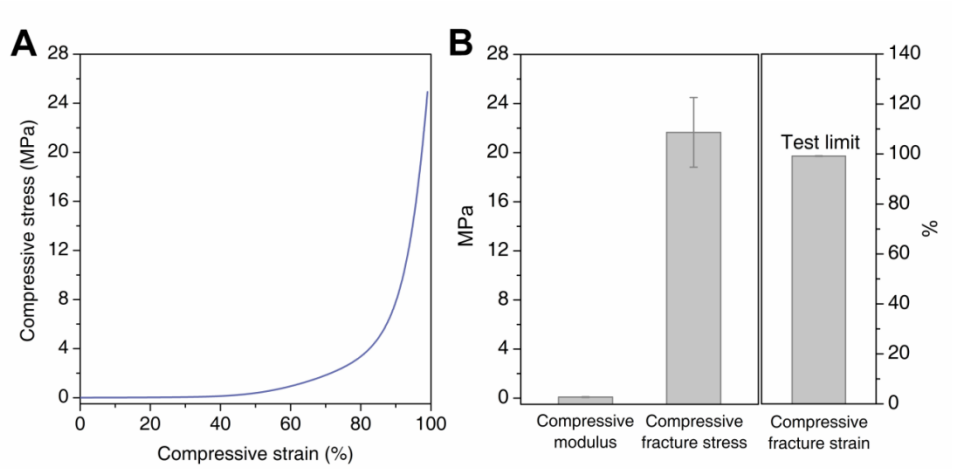

Fig. S3. The compressive behavior of the pTMAO/pSB ZEN hydrogel. The pTMAO/pSB ZEN hydrogel was made according to the composition of 1-4-0.1/4-0.1-0.01. Note that *x*, *y*, and *z* for x_1-y_1-z_1/x_2-y_2-z_2 represent the molar monomer concentration, crosslinker (mol% respect to monomer), and initiator concentration (mol% respect to monomer) for the two component networks, respectively. (**A** and **B**) Representative compressive curve (A), Compressive modulus, fracture stress and fracture strain (B) of pTMAO/pSB hydrogel.

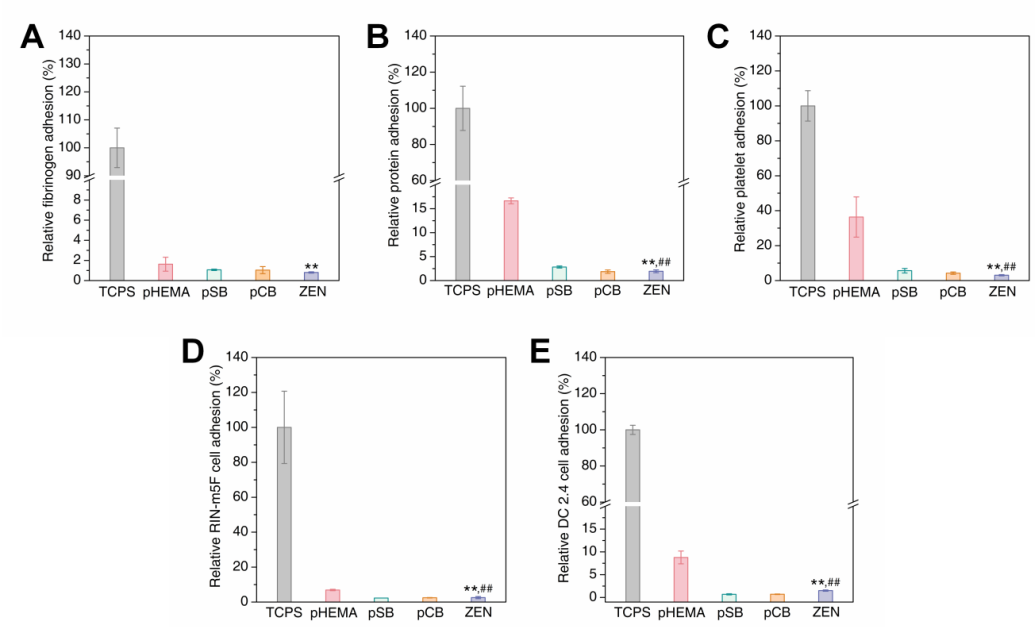

Fig. S4. Biofouling tests of different material surfaces. Relative (**A**) human fibrinogen protein, (**B**) undiluted human serum proteins adsorption, (**C**) rat platelets, (**D**) RIN-m5F cells, and (**E**) DC 2.4 cells adhesion onto the tissue culture polystyrene (TCPS) and different hydrogel surfaces. All the data were normalized with respect to TCPS. $^{**}P < 0.01$ *vs.* TCPS, $^{\#\#}P < 0.01$ *vs.* pHEMA.

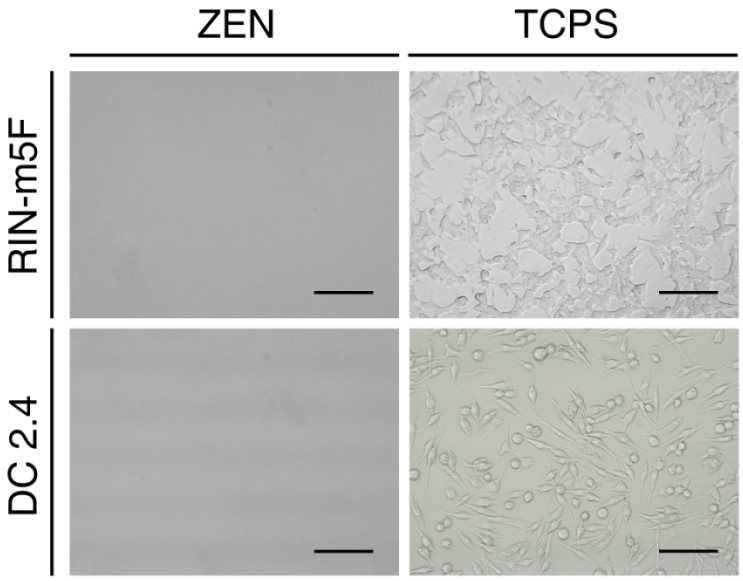

Fig. S5. Cells adhesion on different material surfaces. Optical images of RIN-m5F cells and DC 2.4 cells adhered onto tissue culture polystyrene (TCPS) and the pCB/pSB ZEN hydrogel surfaces. Scale bars represent 50 μm.

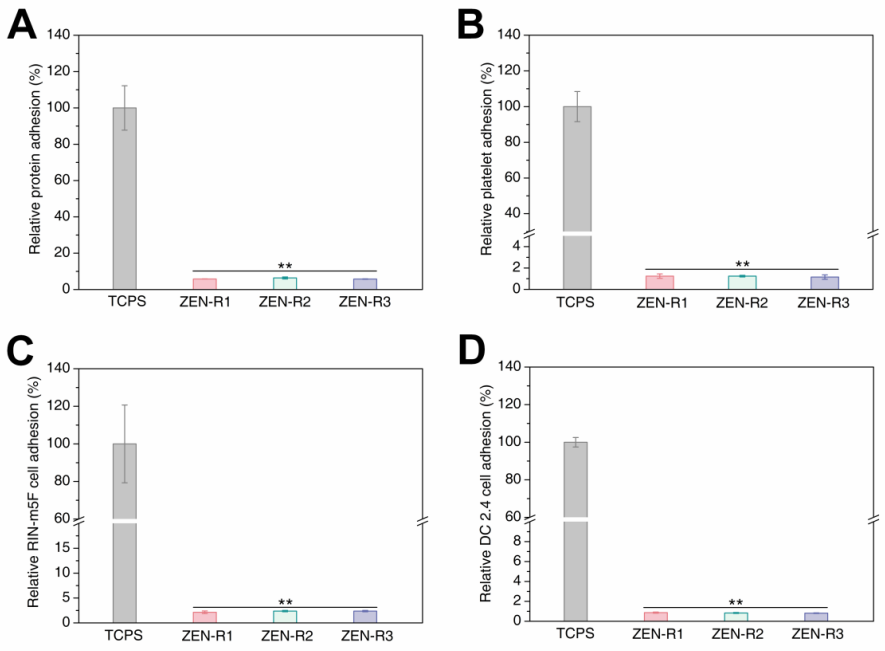

Fig. S6. Biofouling tests of ZEN hydrogel surfaces after autoclaving sterilization. Relative (**A**) undiluted human serum proteins, (**B**) rat platelets, (**C**) RIN-m5F cells, and (**D**) DC 2.4 cells adhesion onto the tissue culture polystyrene (TCPS) and the pCB/pSB ZEN hydrogel surfaces after one to three rounds of autoclaving sterilization. Each round of autoclaving sterilization is indicated as ZEN-R1, ZEN-R2, and ZEN-R3, respectively. All the data were normalized with respect to TCPS. $^{**}P < 0.01$ *vs.* TCPS.

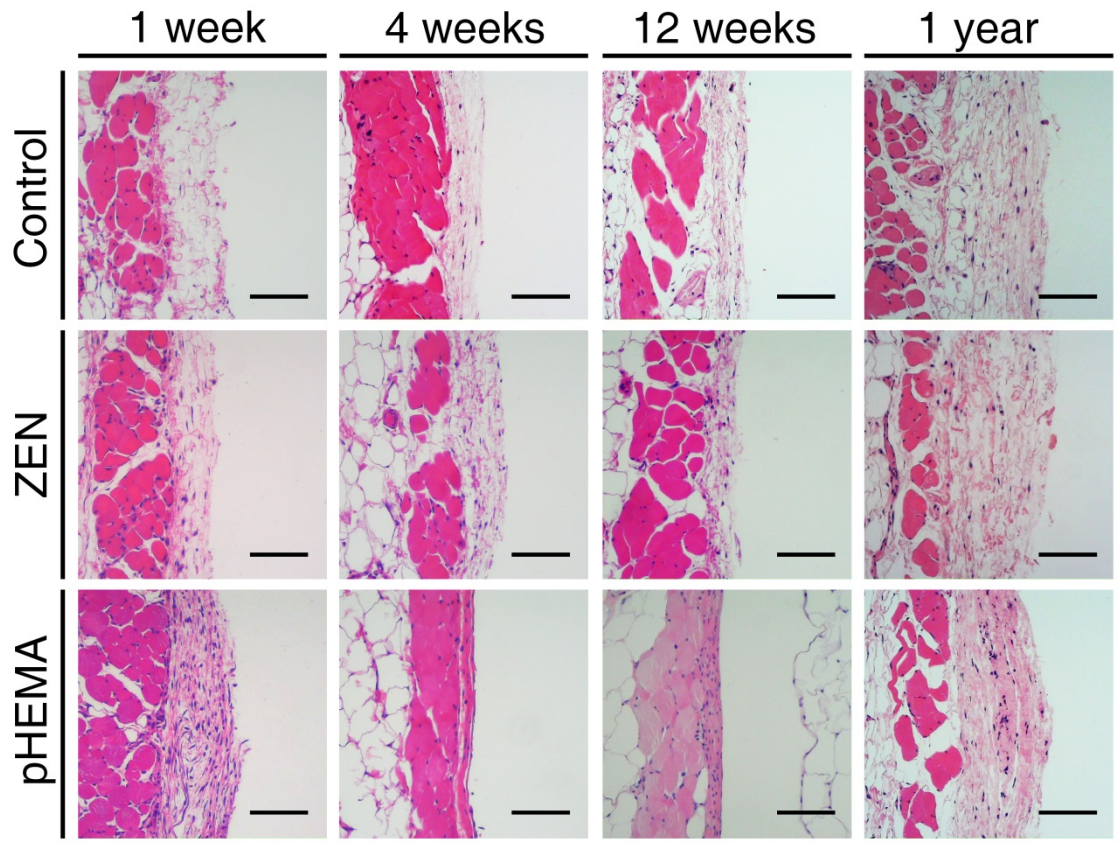

Fig. S7. H&E staining for mouse skin tissues with different hydrogel samples after subcutaneous implantation in mice for 1, 4, 12 weeks, and 1 year. Positive controls were skin tissues collected from mice that were implanted with pHEMA hydrogels, while negative controls were collected from mice that did not undergo any surgeries or other experiments. n = 3 for all the implantation experiments (three mice per experiment group/condition, two hydrogel samples per mouse for ZEN or pHEMA hydrogels implantation). Scale bars represent 100 μm. The basophilic discoloration and increased cell counts (stained dark purple) at the tissue in contact with pHEMA hydrogels indicates the accumulation of cells into the interface.

Movie S1. ZEN hydrogel sheet can be stretched and folded. The pCB/pSB ZEN hydrogel sheet can be stretched and folded repeatedly without any visible damage observed. Movice credit: D. Dong (University of Washington, Tianjin University).

Movie S2. ZEN rope-shaped hydrogel can tie knots. The pCB/pSB ZEN rope-shaped hydrogel with a cross-section diameter of 6 mm can tie multiple knots and be stretched without breaking. Movice credit: D. Dong (University of Washington, Tianjin University).