Supplementary Material

Tough Hydrogel-Elastomer Hybrids Hydrophobically Regulated by MXene for Harsh Environments Motion Monitoring

Shengping Dai[a,c]*, Hongwei Hu[b], Yixing Zhang[b], Jiang Xu[d], Yan Zhong[b], Guanggui Cheng[b]*, Jianning Ding[b,c,d]

a. School of Chemistry and Chemical Engineering, The Key Laboratory of Coordination Chemistry of Jiangxi Province, Humic Acid Utilization Engineering Research Center of Jiangxi Province, Jinggangshan University, Ji'An, 343009, P.R. China;

b. Institute of Intelligent flexible Mechatronics, Jiangsu University, Zhenjiang, 212013, P. R. China;

c. Jiangsu Province Cultivation base for State Key Laboratory of Photovoltaic Science and Technology, Changzhou University, Changzhou, 213164, Jiangsu, China;

d. School of Mechanical Engineering, Yangzhou University, Yangzhou 225127, P. R. China.

Corresponding author email: daishengping@jgsu.edu.cn; ggcheng@ujs.edu.cn

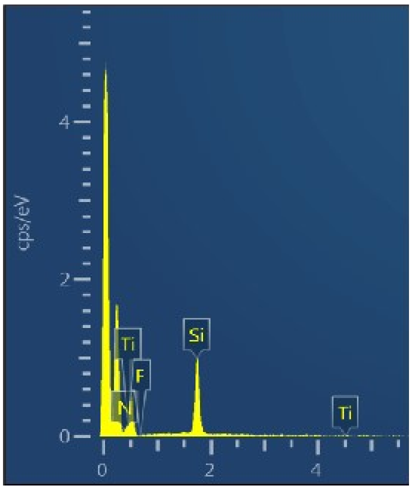

Fig. S1 EDS element content map of the $PMATM_{15}$

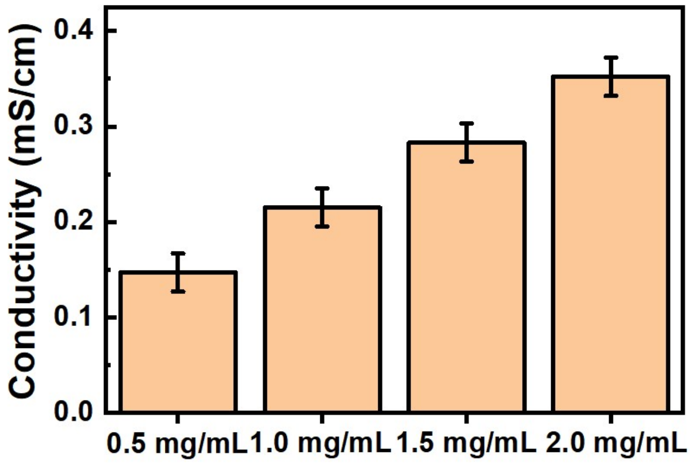

Fig. S2. the conductivity of the hydrogel with different MXene concentrations.

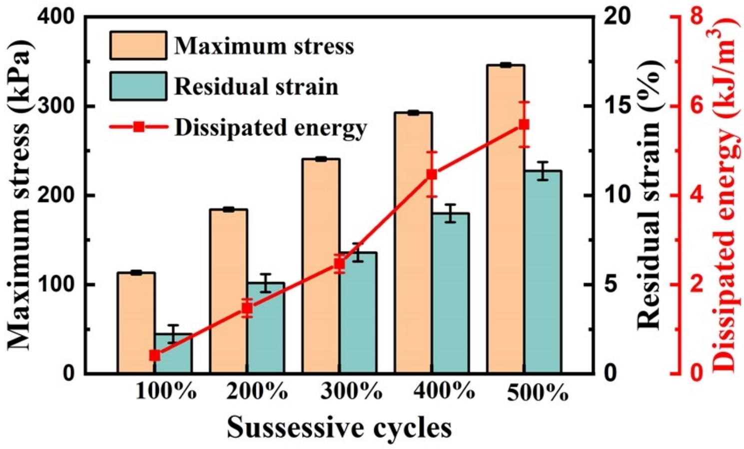

Fig. S3 Maximum stress, residual strain and energy dissipation curve of $PMATM_{15}$ hydrogel in the 0-500%.

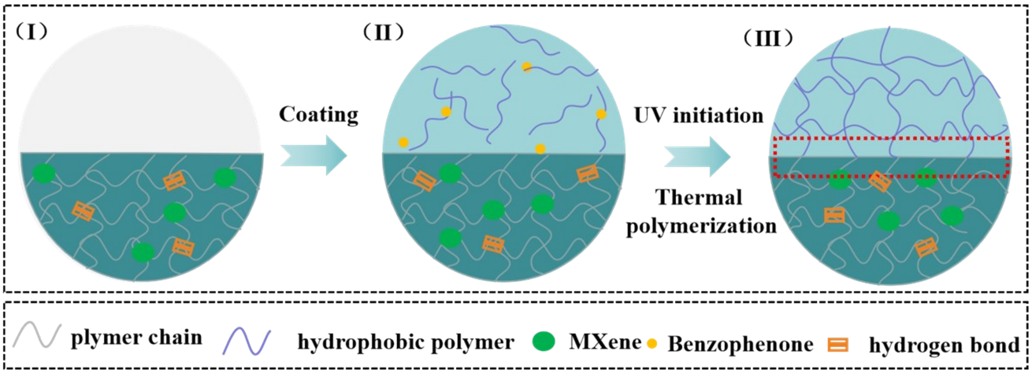

Fig. S4 Schematic of the preparation process of PMATM$_x$@P.

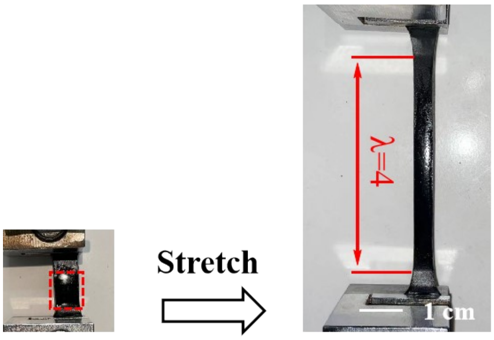

Fig. S5 the stretching image of the hydrogel with PDMS.

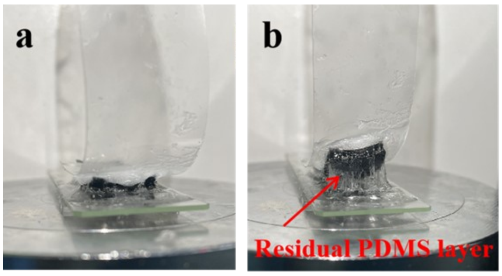

Fig. S6 photograph of 90° peeling experiment (a)before and (b) after.

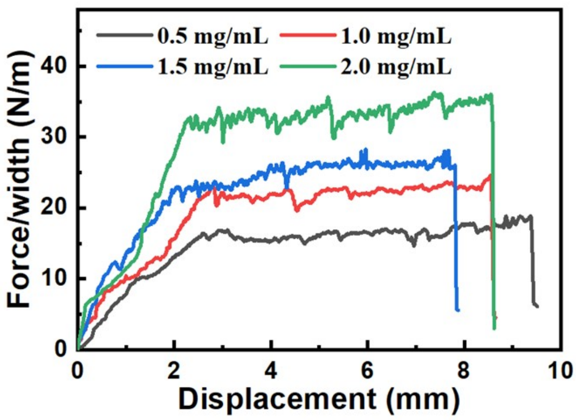

Fig. S7 Peel strength curves of PMATM$_x$@P hydrogel hybrid with different MXene content (without UV).

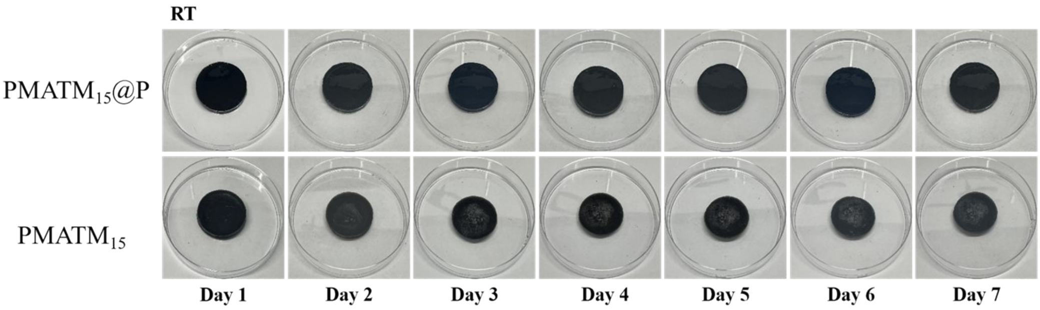

Fig. S8 the image of $PMATM_{15}$ hydrogel and $PMATM_{15}$@P hydrogel hybrid for 7 days at room temperature.

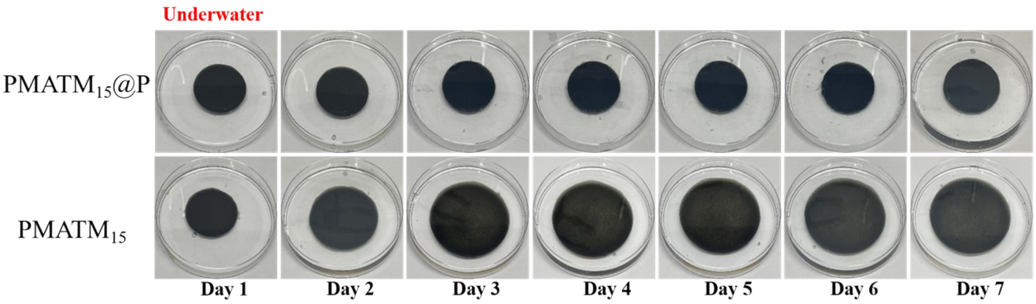

Fig. S9 the image of $PMATM_{15}$ hydrogel and $PMATM_{15}$@P hydrogel hybrid underwater for 7 days.

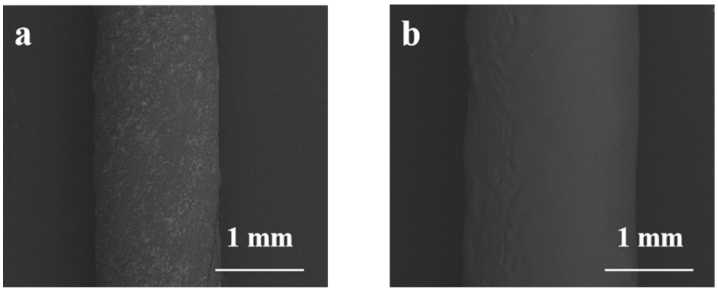

Fig. S10 (a) SEM image of $PMATM_{15}$ hydrogel, (b) SEM image of $PMATM_{15}$@PF hydrogel hybrid fiber.

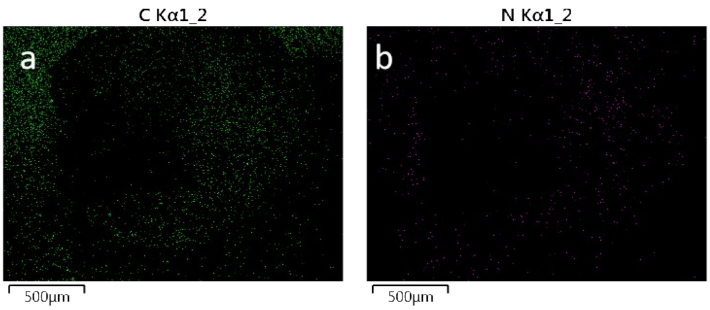

Fig. S11 The distribution photo of elements (a) C and (b) N of hydrogel hybrid fiber.

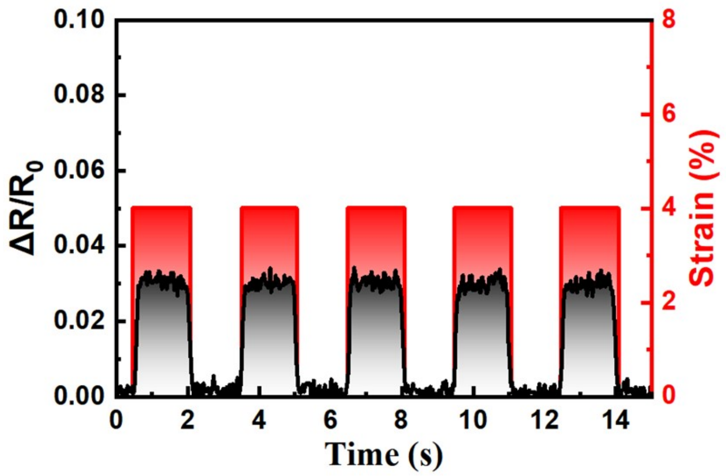

Fig. S12 relative resistance–time and strain-time cycling double Y axis curves (0.5% strains).

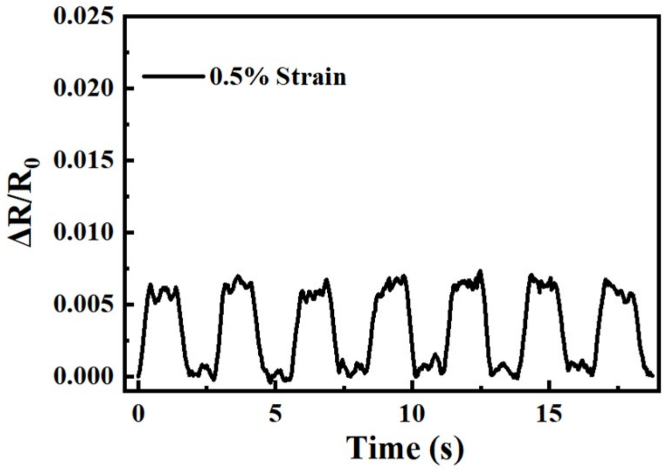

Fig. S13 relative resistance–time cycling curves under 0.4% low strains.

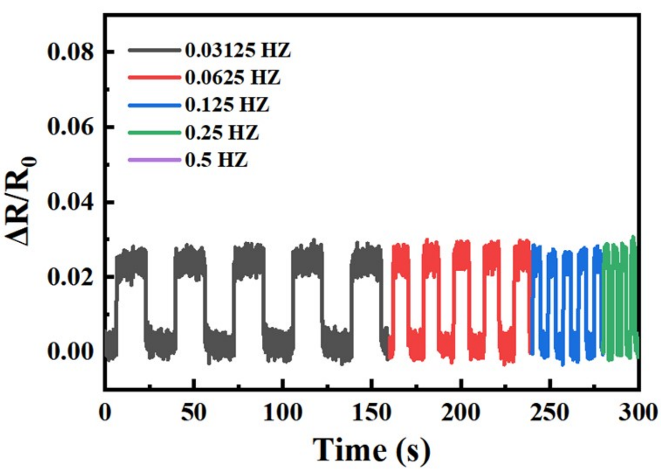

Fig. S14 relative resistance–time cycling curves with different frequency.