

Supporting Information

Stretchable Polyurethane Sponge Scaffold Strengthened Shear Stiffening Polymer and Its Enhanced Safe-guarding Performance

Sheng Wang^a, Shouhu Xuan^{b}, Yunpeng Wang^b, Chenhui Xu^b, Ya Mao^a, Mei Liu^a, Linfeng Bai^a,
Wanquan Jiang^{a*} and Xinglong Gong^{b*}*

^aDepartment of Chemistry, University of Science and Technology of China (USTC), Hefei 230026, P. R. China

^bCAS Key Laboratory of Mechanical Behavior and Design of Materials, Department of Modern Mechanics, USTC, Hefei 230027, P. R. China

**Corresponding author: Tel: 86-551-63607605; Fax: 86-551-63600419.*

E-mail: xusnh@ustc.edu.cn (S. H. Xuan)

jiangwq@ustc.edu.cn (W.Q. Jiang)

gongxl@ustc.edu.cn (X.L. Gong)



Figure S1 the engineered spike for piercing tests.

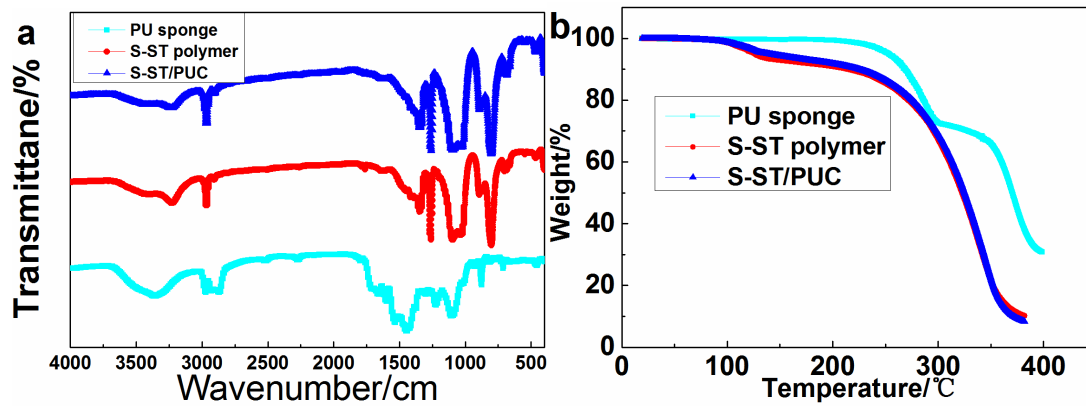


Figure S2 FT-IR spectrum (a) and TG results (b) of S-ST polymer matrix, PU sponge and S-ST/PUC sample in the range of 4000-500 cm^{-1} .

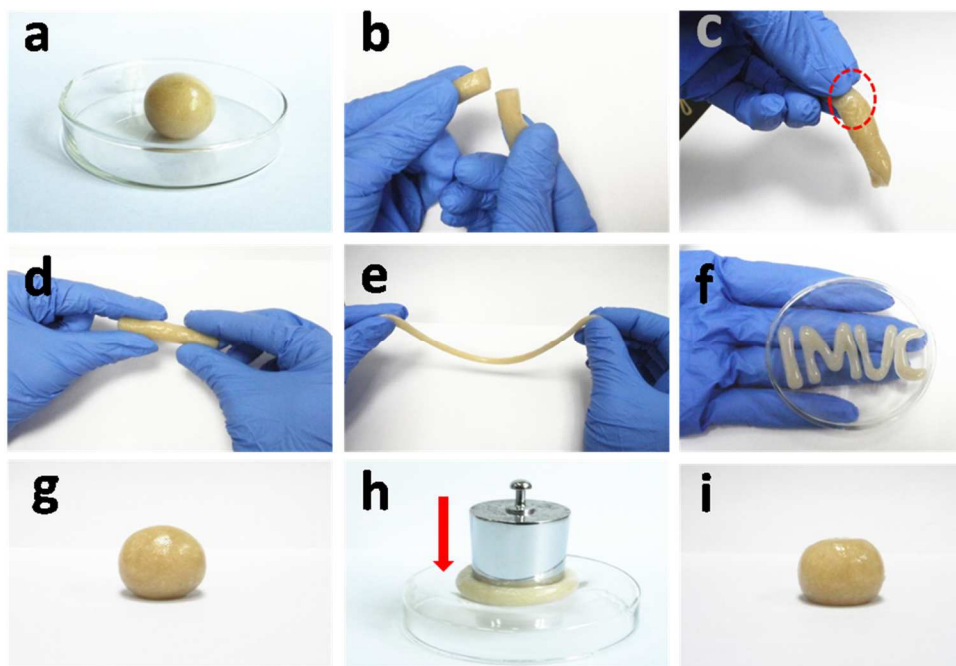


Figure S3 Rate-dependent mechanical properties of the S-ST polymer with different external excitation: pristine sample (a and g); fractures abruptly if stretched quickly (b) and adheres ideally (c); if stretched slowly, the composite is soft and tensile (d-f); flexible and plastic if compressed slowly (h) and small changes in dimensions can be observed if impacted violently (i)

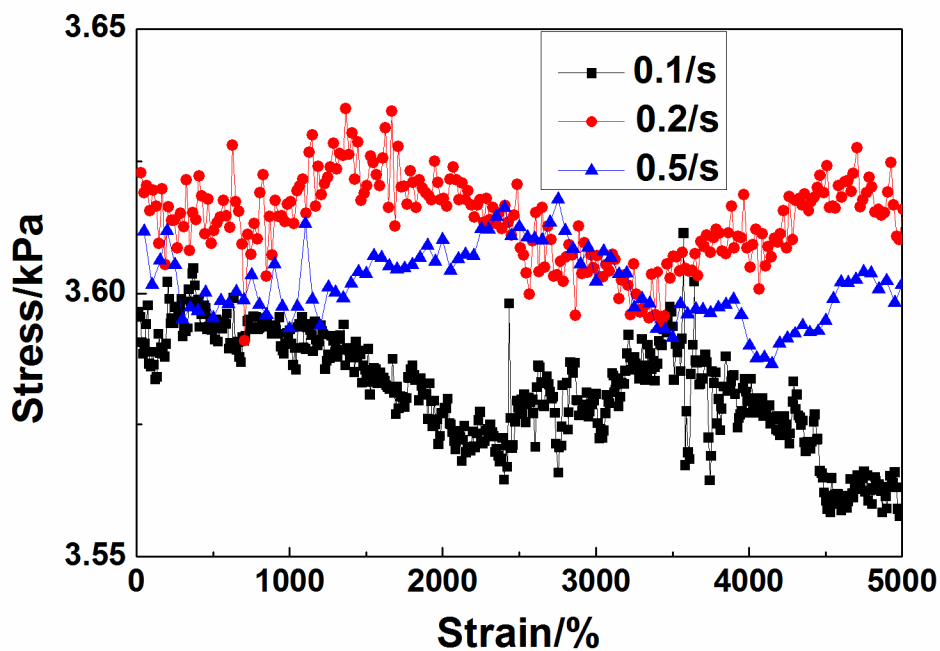


Figure S4 Stress-strain curves of PU sponge under the excitation of different shear rates.

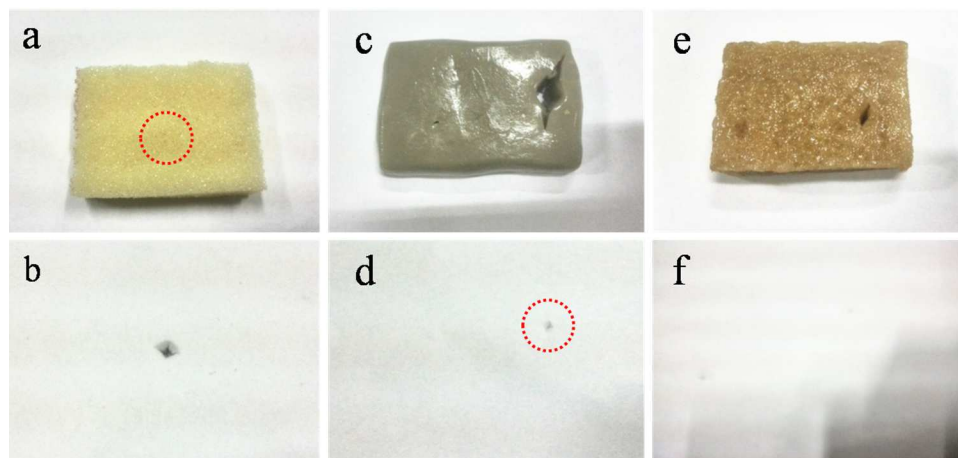


Figure S5 The schematic of piercing test results of PU sponge and witness paper (a and b); S-ST polymer and witness paper (c and d); S-ST/PUC and witness paper (e and f).