Supplementary Information

Redox and Conductive Underwater Adhesive: An Innovative Electrode Material for Convenient Construction of Flexible and Stretchable Supercapacitor

Chuanling Mu, Xue Wang, Zhiyuan Ma, Xiaohuan Liu, and Wen Li*

State Key Laboratory of Supramolecular Structure and Materials, College of Chemistry, Jilin University. Qianjin Avenue 2699, Changchun, 130012, China

Email: wenli@jlu.edu.cn

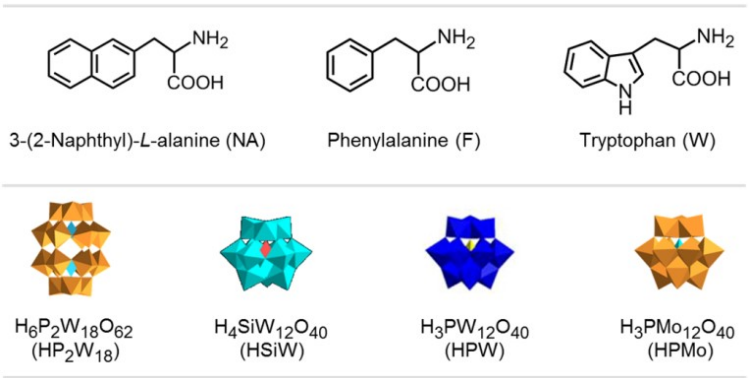

Fig. S1 Schematic structures of the aromatic amino acids and heteropoly acids.

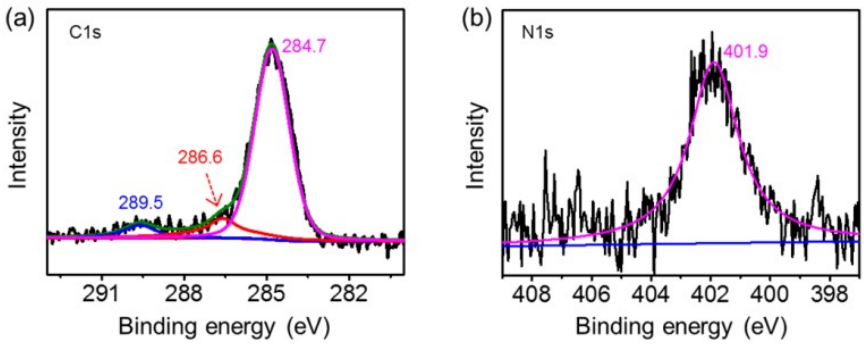

Fig. S2 XPS spectra of the C1s (a) and N1s (b) of the NA/HP_2W_{18}/Ag adhesive.

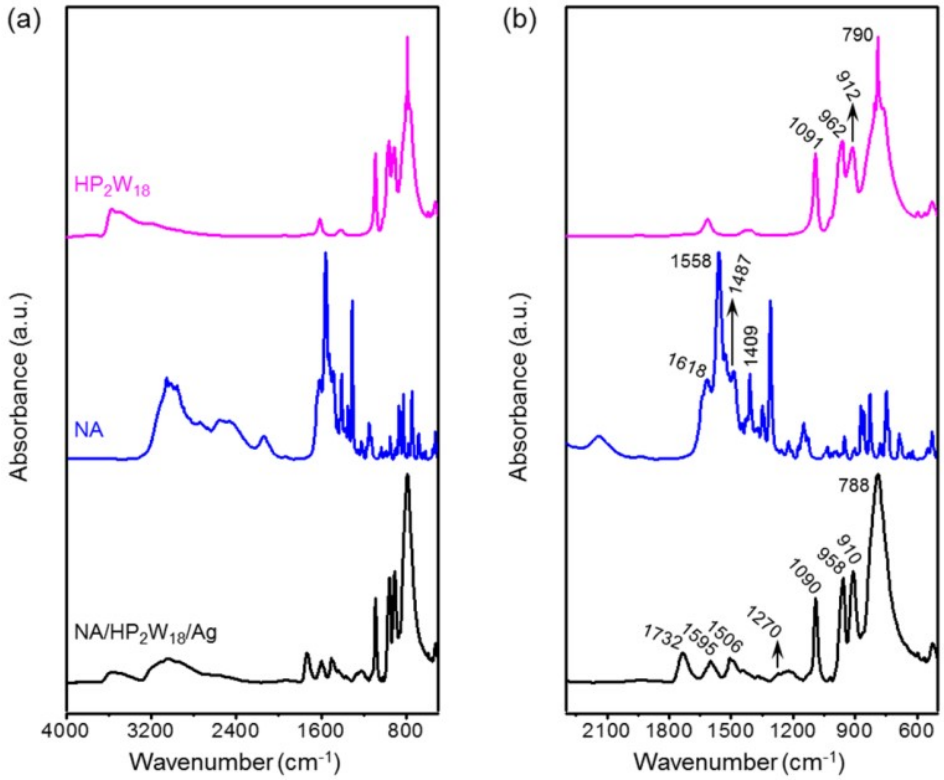

Fig. S3 FT-IR spectra of HP_2W_{18}, NA and NA/HP_2W_{18}/Ag adhesive: (a) the full spectra in the range of 500-4000 cm^{-1}, (b) the enlarged spectra from 500 to 2300 cm^{-1}.

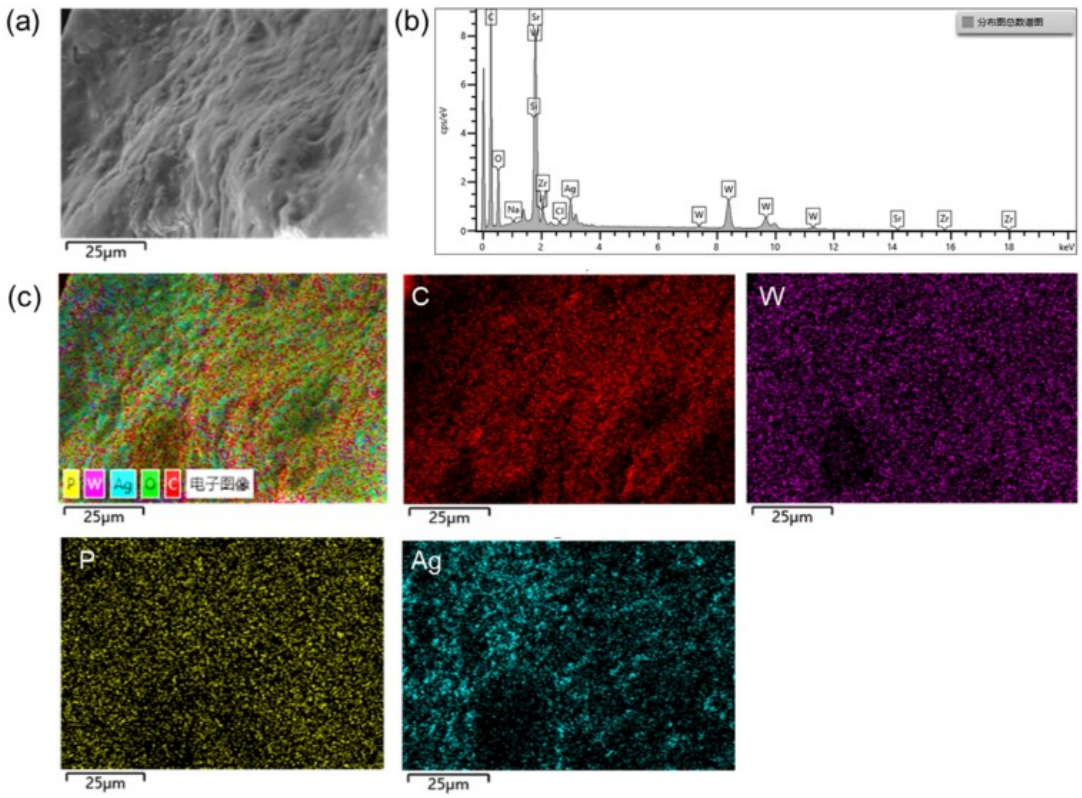

Fig. S4 (a) SEM images of NA/HP_2W_{18}/Ag adhesive. (b) EDS spectrum of NA/HP_2W_{18}/Ag adhesive. (c) EDS mapping of NA/HP_2W_{18}/Ag adhesive, the elements C, W, P and Ag.

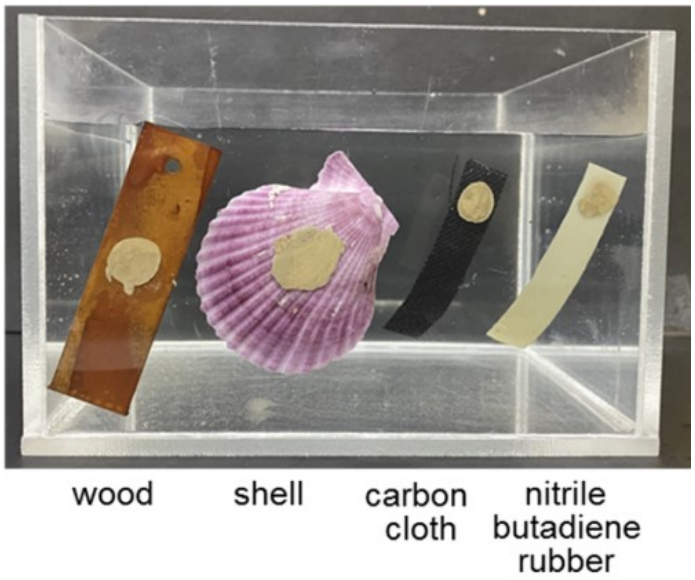

Fig. S5 Digital images of NA/HP_2W_{18}/Ag adhesive attached on various dissimilar substrates.

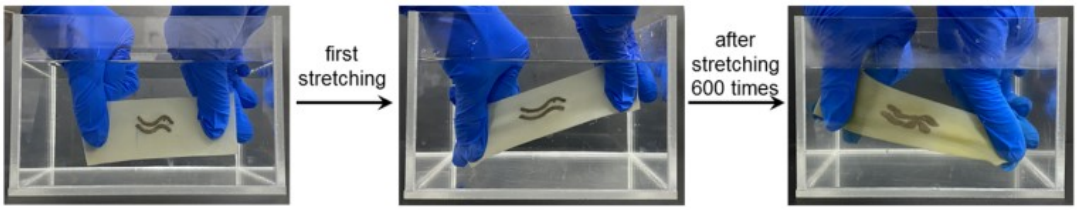

Fig. S6 Photographs of NA/HP_2W_{18}/Ag adhesive printed onto nitrile-butadiene rubber bending with repeated stretching (600 times) under the water line.

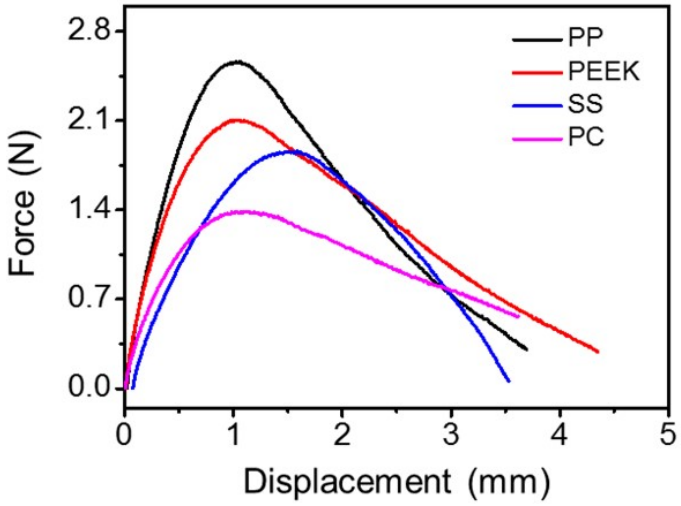

Fig. S7 The force versus displacement curves were obtained when the adhered plates were separated at a rate of 10 mm min^{-1}.

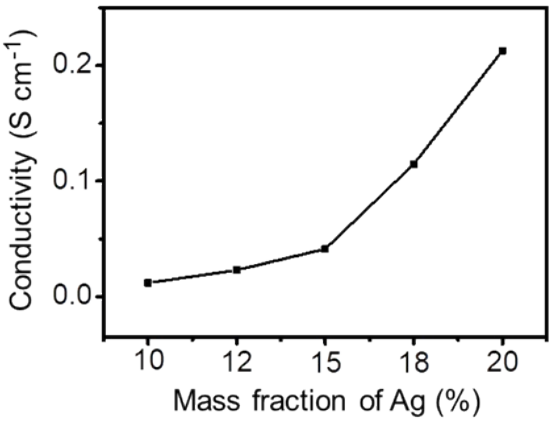

Fig. S8 Conductivity of the NA/HP_2W_{18}/Ag adhesive with different mass fraction of Ag.

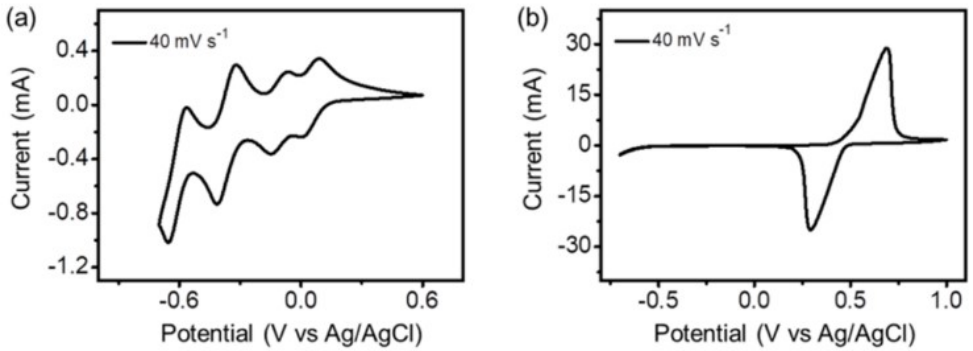

Fig. S9 CV curves of the individual HP_2W_{18} (a) and Ag (b).

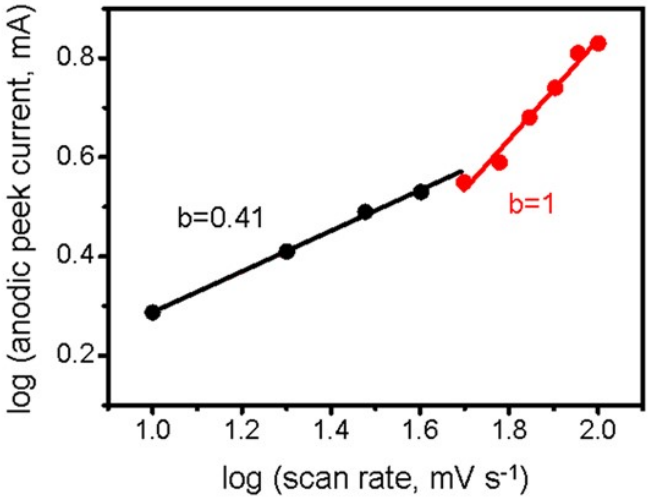

Fig. S10 The log (anodic peak (II) current density) versus log (scan rate) to determine the b values for the CV curves in the scan rate range 10 ~ 100 mv s^{-1}.

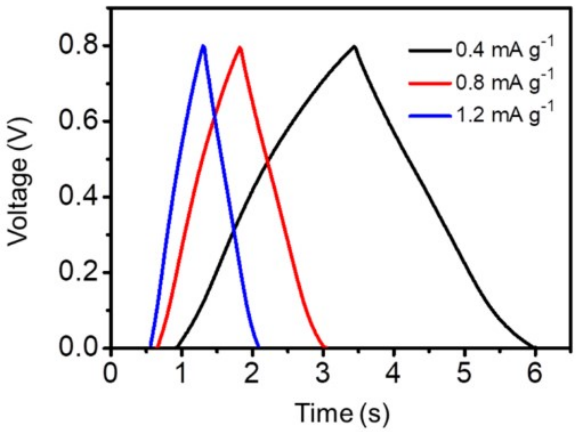

Fig. S11 GCD curves (measured from 0.4 to 1.2 mA g^{-1}) of the carbon paper working electrode.

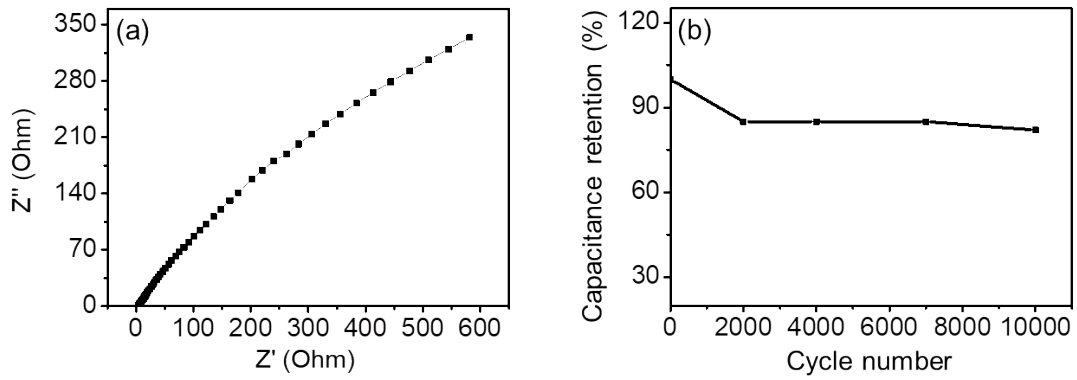

Fig. S12 (a) EIS curve of the NA/HP_2W_{18}/Ag||PVA||NA/HP_2W_{18}/Ag SC in the frequency range of 100000 to 0.01 Hz; (b) Capacitance retention of the NA/HP_2W_{18}/Ag||PVA||NA/HP_2W_{18}/Ag SC during 10000 charge/discharge cycles.

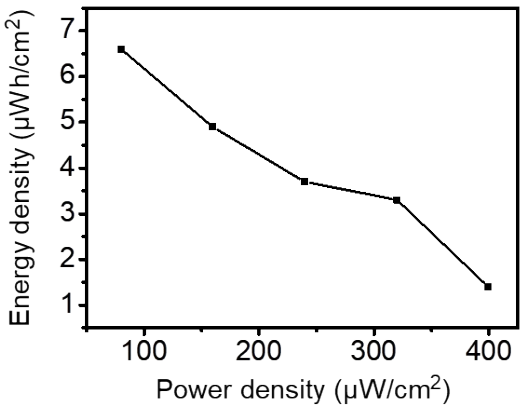

Fig. S13 Ragone plot of the NA/HP_2W_{18}/Ag||PVA||NA/HP_2W_{18}/Ag.

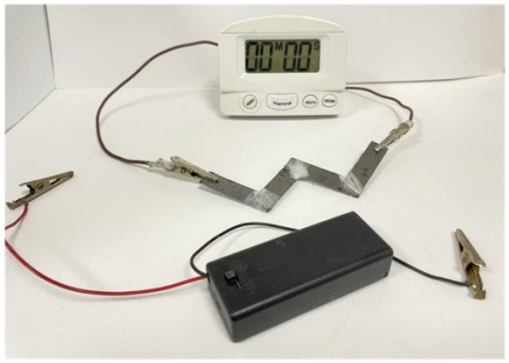

Fig. S14 Three NA/HP_2W_{18}/Ag||PVA||NA/HP_2W_{18}/Ag SCs in series can light up the electronic watch for more than 3 minutes after charging with a commercial battery for 60 seconds.

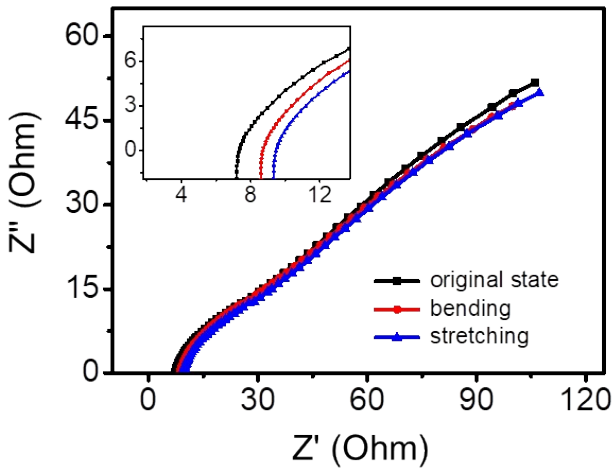

Fig. S15 Nyquist plots of the NA/HP_2W_{18}/Ag‖PVA‖NA/HP_2W_{18}/Ag flexible supercapacitor: original state; bending angle: 180°; stretching ratio: 80%.

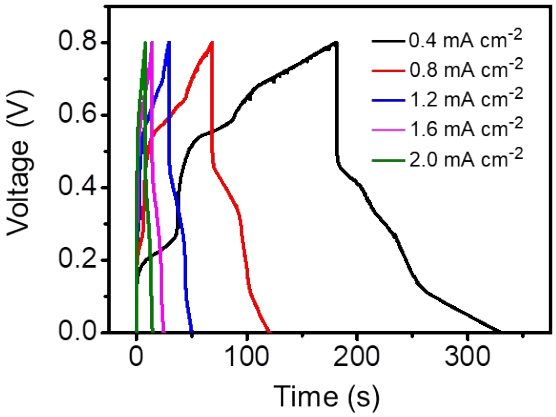

Fig. S16 GCD curves of NA/HP_2W_{18}/Ag||PVA||NA/HP_2W_{18}/Ag flexible supercapacitor measured in the range of 0.4 ~ 2.0 mA cm^{-2}.

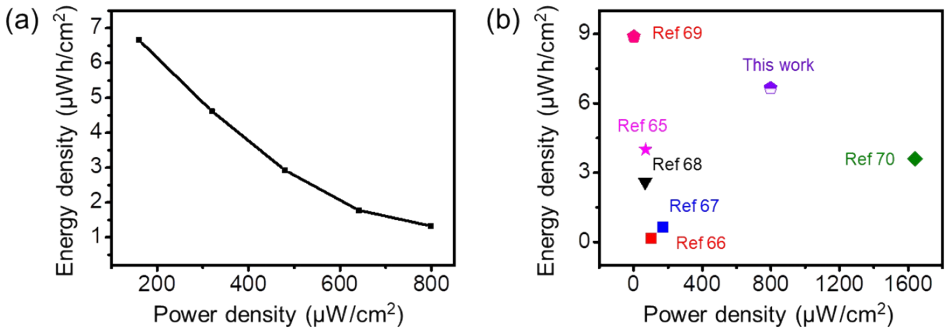

Fig. S17 (a) Ragone plot of the NA/HP_2W_{18}/Ag||PVA||NA/HP_2W_{18}/Ag flexible supercapacitor. (b) Ragone plots of the stretchable supercapacitor in comparison with other stretchable supercapacitor devices.