Supplementary Information

Facile Ion-exchange Synthesis of Silver Films as Flexible Current Collectors for Micro-Supercapacitors

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Calculation

To achieve the Ragone plot, the power density (*P*) and energy density (*E*) can be calculated from the data of cyclic voltammetry measured at the scan rates of 0.01~500 V s^{-1}

The capacitance values of SMIE-MSCs were calculated from the CV data according to the following equation (1):

$$C_{cell} = I/(dV/dt) \quad (1)$$

Where *I* refers to the mean current in the CV curves; *dV/dt* refers to the scan rate in CV curves

The area and stack capacitance values of SMIE-MSCs were calculated according to the following equation (2) and equation (3):

$$C_A = 2 \times C_{Cell}/A \quad (2)$$

$$C_V = 2 \times C_{Cell}/V \quad (3)$$

Where C_{cell} is the capacitance of the 2-electrode cell, *A* and *V* refer to the surface area and volume of the device at one electrode, respectively.

The energy density and power density were calculated according equation (4) and equation (5):

$$E = \frac{1}{2} \times \frac{C_V \times (\Delta V)^2}{3600} \quad (4)$$

Where E is the energy density (Wh/cm^3), C_V is the stack capacitance and ΔV is the discharge

voltage range (V).

$$E = \frac{1}{2} \times \frac{C_V \times (\Delta V)^2}{3600} \quad (5)$$

where P is the power density (W/cm^3), E is the volumetric energy density and t is the discharge time (s)

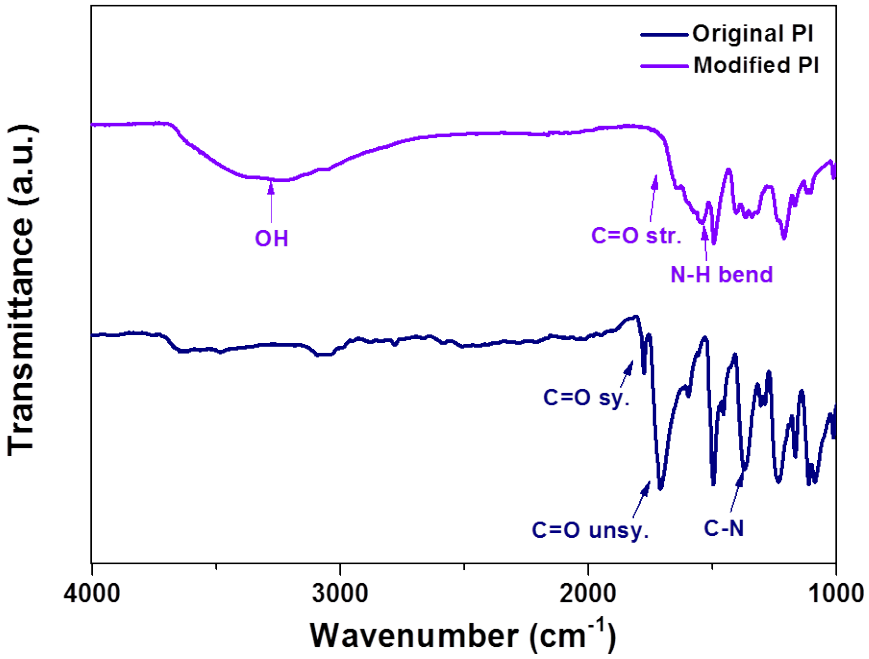

Fig. S1 FTIR image of original PI and modified PI. The peaks at 1775 and 1718 cm^{-1} are related to C=O symmetric vibration and unsymmetric vibration, respectively, and the peak at 1370 cm^{-1} is related to C-N vibration. After KOH modification, above peaks are weaken and diminished strongly. Two new peaks corresponding to C=O stretching and N-H bending appears, which is attributed to the hydrolytic cleavage of the imide groups contained in the repeating unit of PI.

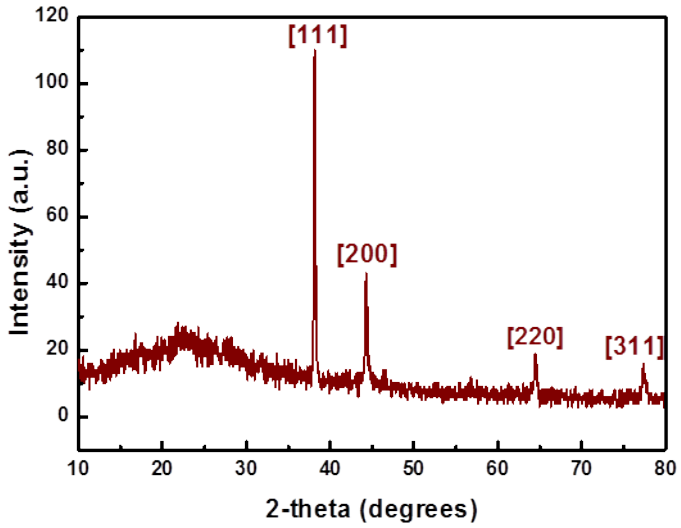

Fig. S2 XRD image of SMIE-Ag. From the figure, it can be seen that four diffraction peaks, corresponding to [1 1 1], [2 0 0], [2 2 0], [3 1 1], respectively, can be found between 30◦and 80◦, indicating that the films are constructed by face-centered cubic Ag crystalline particles.

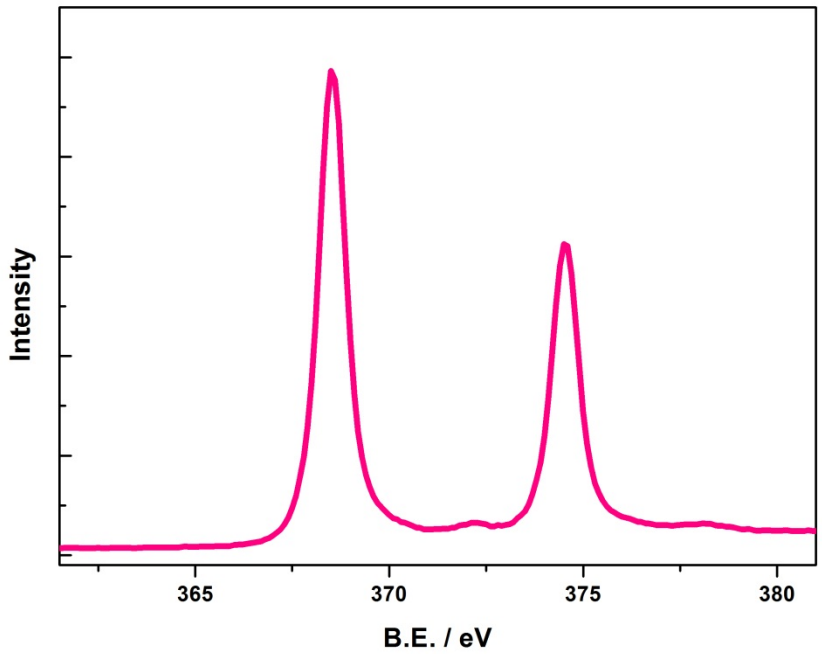

Fig. S3 XPS image of SMIE-Ag. The Ag 3d peaks confirm the formation of Ag.

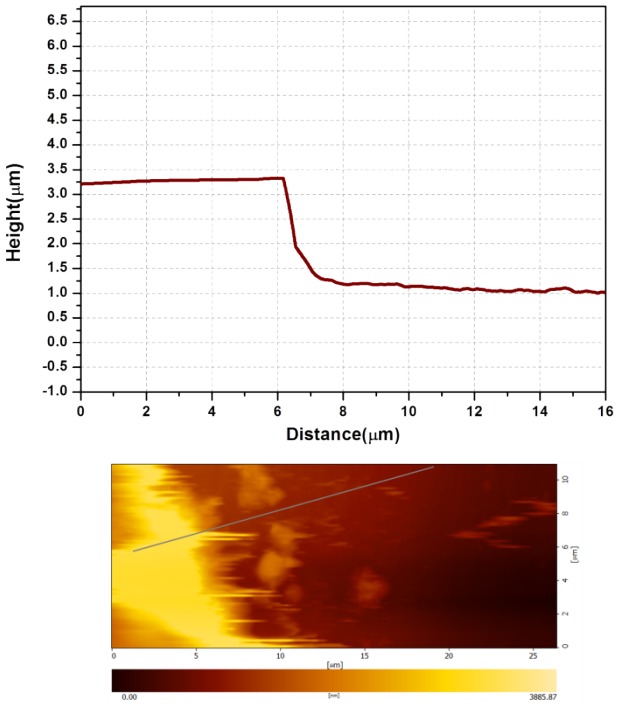

Figure S4. AFM image and height profile of Electrode on SMIE-MSCs. The thickness of the IDEs is about 2 μm. A clear gap exists between substrate and IDEs.

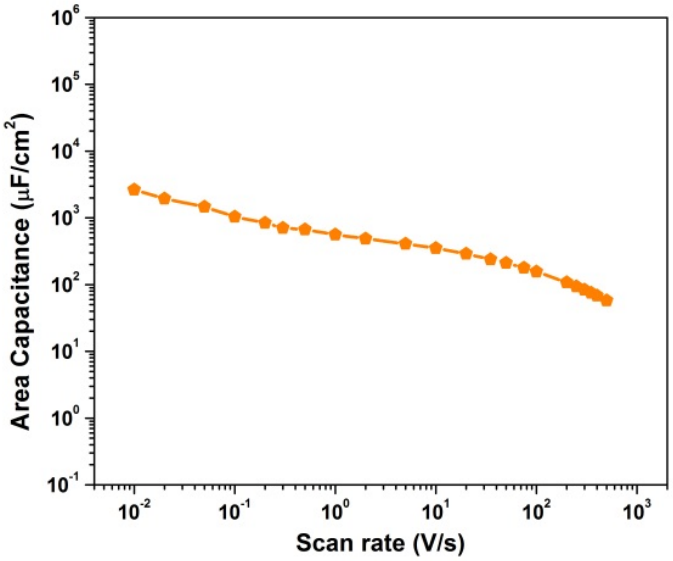

Figure S5. Specific area capacitance at different scan rates

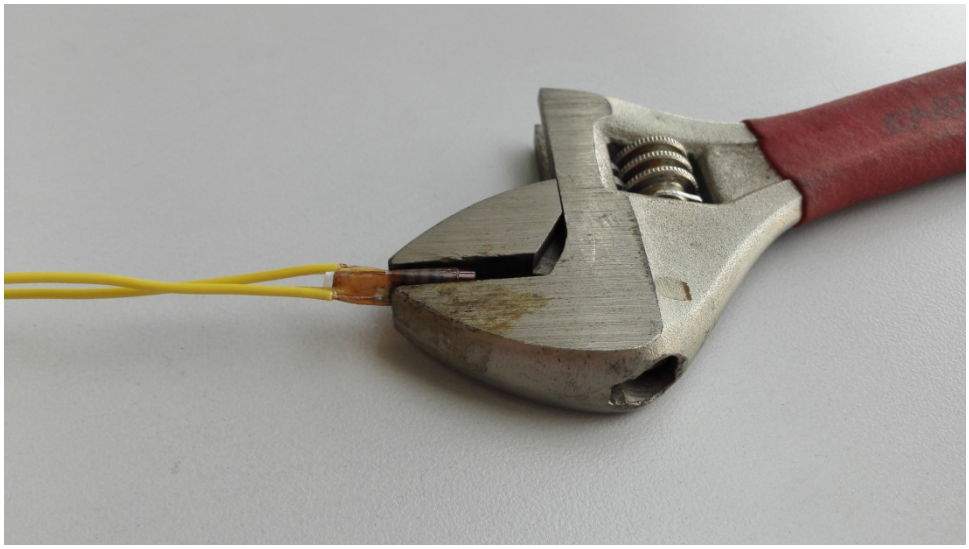

Figure S6. Setup for static mechanical test. SMIE-MSCs are mounted onto a spanner. Controlling two clamps, CV tests can be done in different bending radii.

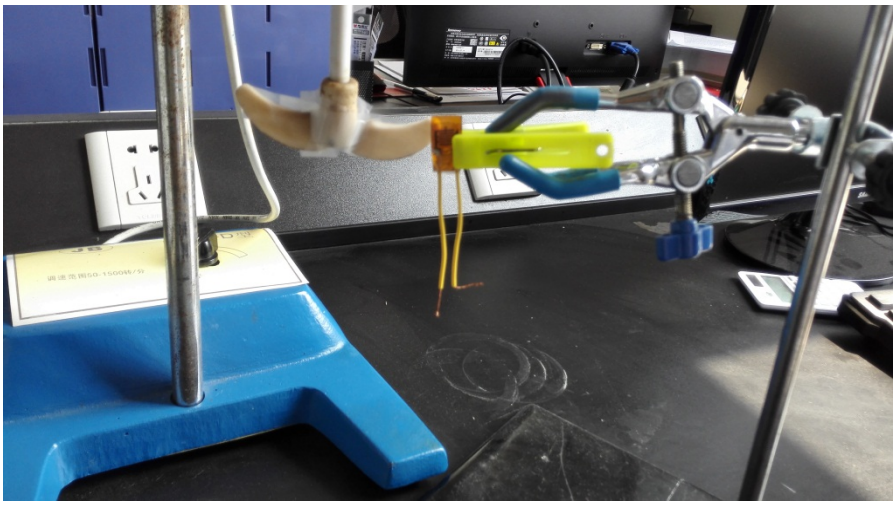

Figure S7. Setup for dynamic mechanical test. The blade of machine can cause the bending state on the free-end of MSCs.