Supporting Information

Easily Synthesized Polyaniline@Cellulose Nanowhiskers Better Tune Network Structures in Ag-Based Adhesives: Examining the Improvements in Conductivity, Stability, and Flexibility

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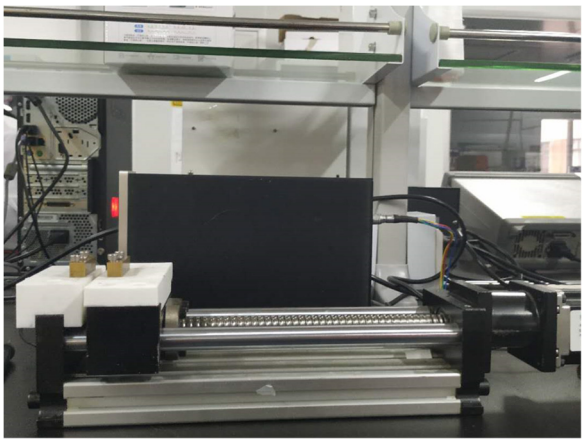

Figure S1. A specialized stretching-system for bending the ECAs sample.

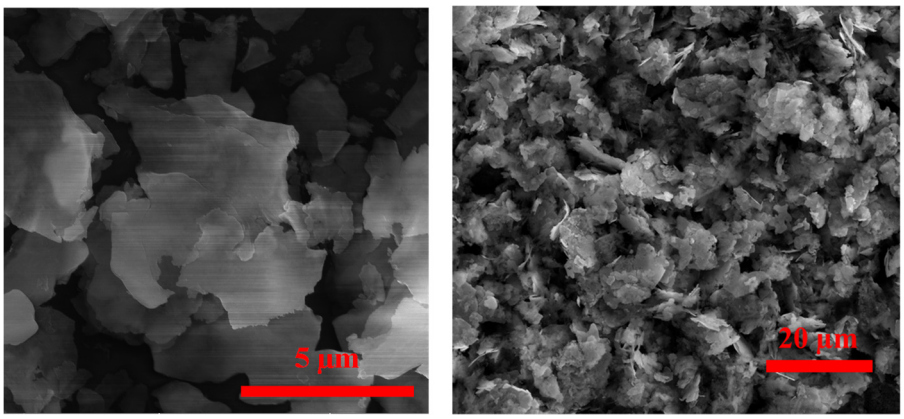

Figure S2. The structure of the silver flakes used in this study.

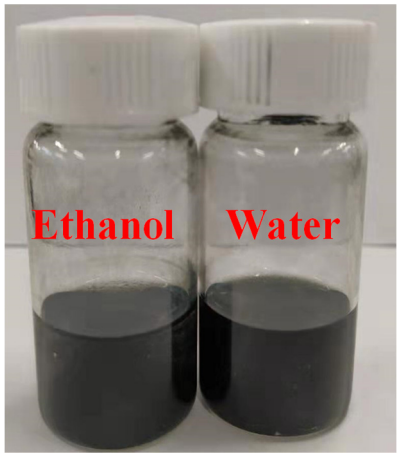

Figure S3. Dispersion test of PANI@CNs (1:4) in water and ethanol

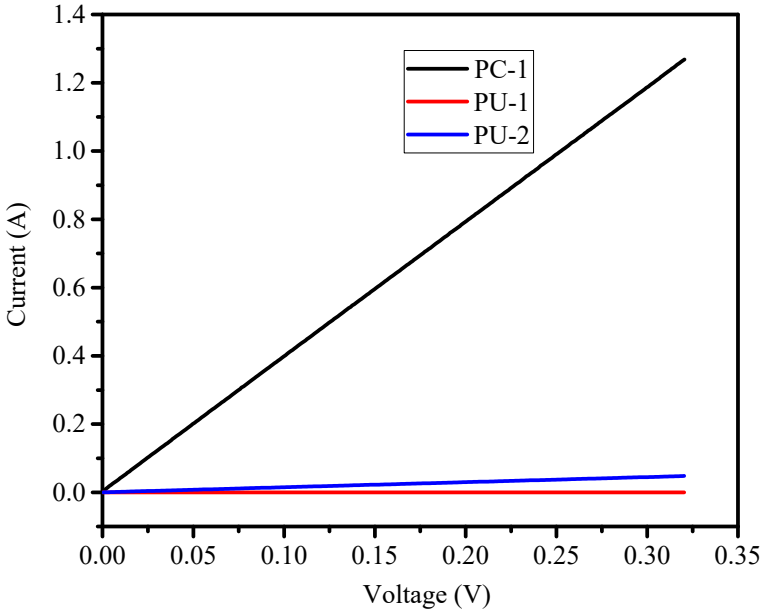

Figure S4. The current-voltage curves of the ECAs with different silver content.

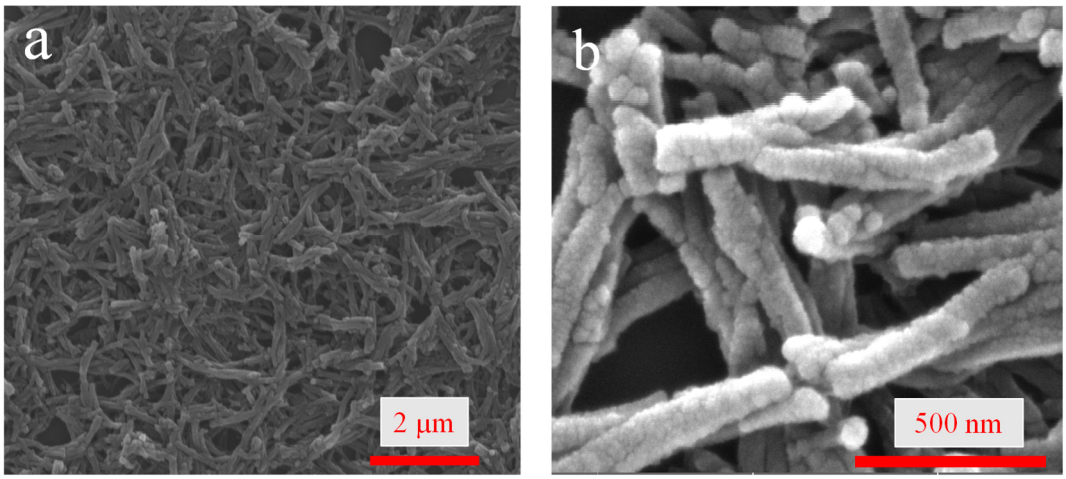

Figure S5. The SEM image of high-aspect-ratio PANI@CNs nanowhiskers

The percolation threshold of conductive fillers declined with an improvement of the aspect ratio (the ratio of length to diameter, L/D) of the fillers [1, 2]. For example, carbon black (CB) is one kind of spherical conductive carbon-materials for constructing conducting composites. Due to its lower aspect ratio (L/D≈1), a high fraction of CB (16%) was required to reach the percolation threshold. In contrast, CNTs with a much higher aspect ratio (L/D > 100) achieved much lower percolation thresholds (5%) [3]. Similarly, the PANI@CNs nanowhiskers (L/D > 10) had a high aspect ratio than common PANI particles (L/D ≈ 1). Thus, PANI@CNs can exhibit better electrical properties than traditional PANI particles in the polymer matrix.

Reference

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