

Figure S1. Schematic diagram and photograph of the stretchable SS 304 current collector.

Table S1. The influence of different parameters on the deformation of collector.

| W / cm | 6<br>Stretchability/ plastic deformation |                  |                   |                  | (L = 0.2) |
|--------|--|------------------|-------------------|------------------|-----------|
|        | H / cm                                   | 5<br>250% / 3.5% | 4<br>170% / 4.3%  | 3<br>120% / 3.3% |           |
| L / cm | 0.6<br>90% / 3.3%                        | 0.5<br>170% / 5% | 0.4<br>190% / 10% | 0.3<br>200% / 4% | (H = 5)   |

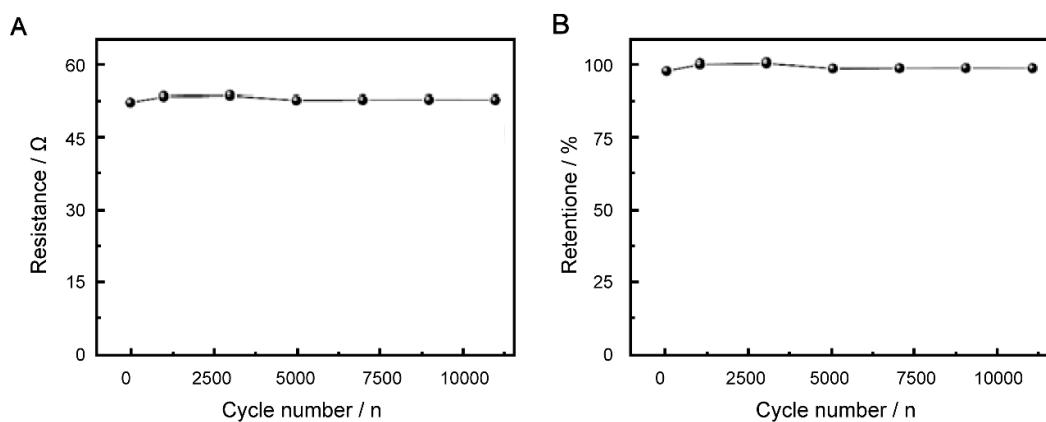


Figure S2. (A) The resistance of current collector after stretching at 250%. (B) The change of the current collector resistances at 250% after stretching.

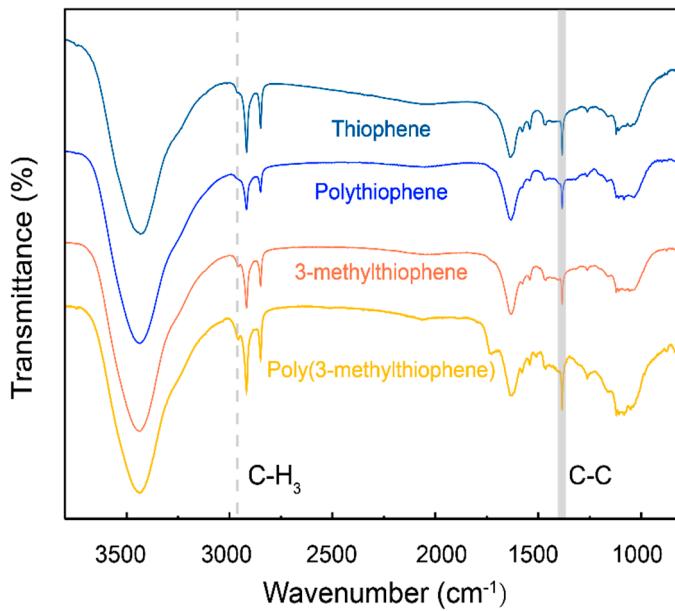


Figure S3. FTIR spectra of thiophene, polythiophene, 3-methylthiophene, and poly(3-methylthiophene).

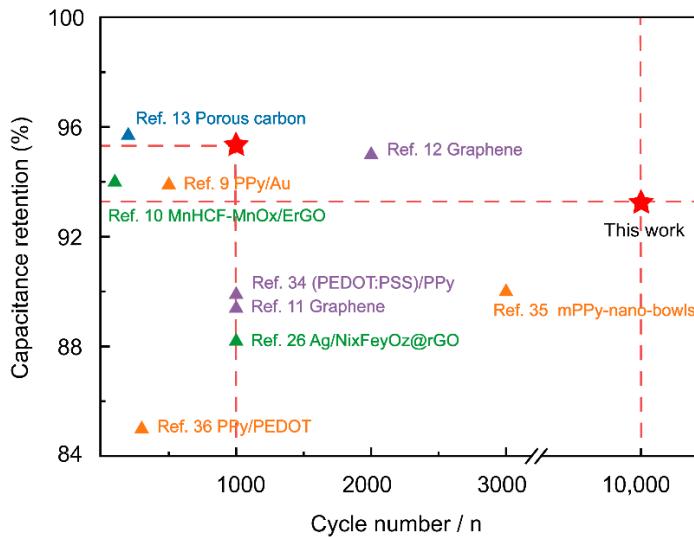


Figure S4. Comparison of conducting polymer electrodes protected by gel electrolyte with previously reported electrode materials under varying cyclic deformation duration.

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