

Supporting Information for

Conducting Polymer Nanowire Arrays with Enhanced Electrochemical Performance

Jiyong Huang, Kai Wang and Zhixiang Wei*

National Center for Nanoscience and Technology, No. 11 Beiyitiao, Zhongguancun, Beijing 100190, P.

R. China. Email: weizx@nanoctr.cn

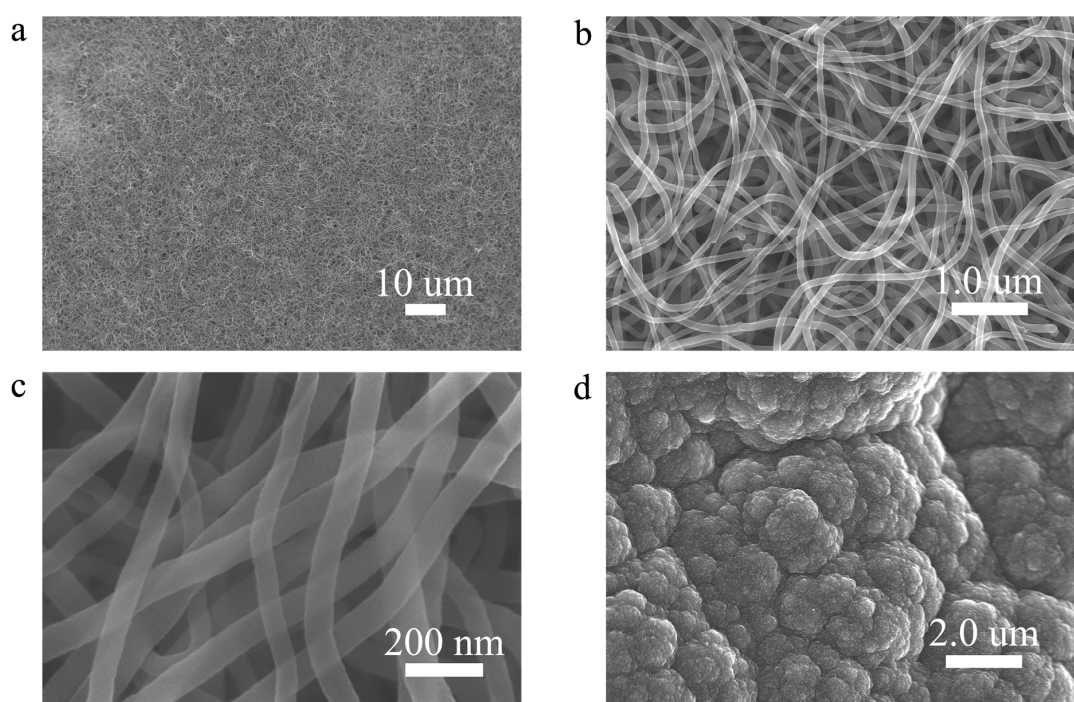


Figure S1 Scanning electron micrograph (SEM) of the disordered PPy NW networks and conventional PPy film. a) Top view of PPy NW networks at low magnification. b) & c) Top view of

the NW networks at high magnification. d) Top view of conventional PPy film at high magnification. The diameters of these NWs range from 80 to 100 nm and their length are several micrometers at least. The high-magnification SEM images of NW networks indicate that these PPy NWs have fine structure with extremely smooth surface. Electrochemical polymerization condition: the electrolyte was a phosphate buffer (PB) solution (pH=6.86) contained 0.145 M distilled pyrrole and 0.01 M *p*-toluenesulfonic acid (*p*-TSA). PPy NW networks can be obtained by using Chronoampermetry at a constant potential of 0.7 V (versus Ag/AgCl) for 10 minutes or Cyclic Voltammetry in the voltage range of -0.2 to 0.7 V (versus Ag/AgCl) at a scan rate of 20 mV s⁻¹ for 20 cycles. Conventional PPy film was prepared at the same condition but only replaced the PB solution by deionized water with the same volume.

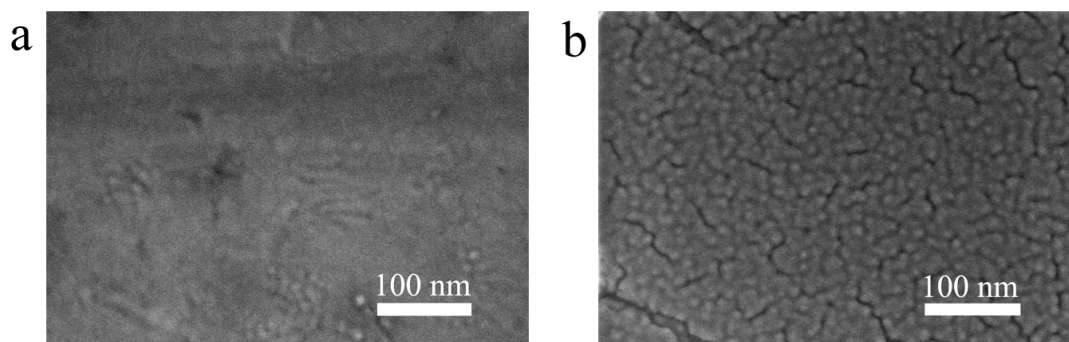


Figure S2 SEM images of the working electrode. a) Surface of naked Pt electrode. b) Surface of Pt electrode coated by a layer of Au nanoislands, which was sputtered by Hitachi ion sputter E-1010, Hitachi.

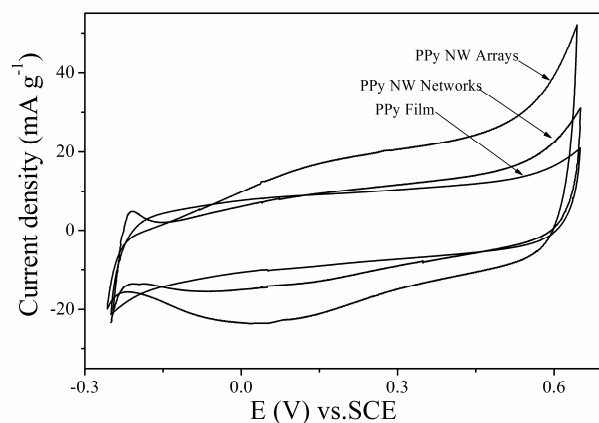


Figure S3 Typical cyclic voltammograms of PPy with different morphologies for a three-electrode capacitor in 0.5 M H₂SO₄ at a scan rate of 50 mV s⁻¹. A couple of peaks at 0.25 V (oxidation peak) and 0.05 V (reduction peak) could be attributed to the transformation of different conductive states of PPy. From the cyclic voltammetry (CV) curve, PPy NW arrays (green curve) were found to exhibit a higher current response than PPy NW networks (blue curve) and film (red curve) which indicates the electrochemical property of PPy is remarkably improved.

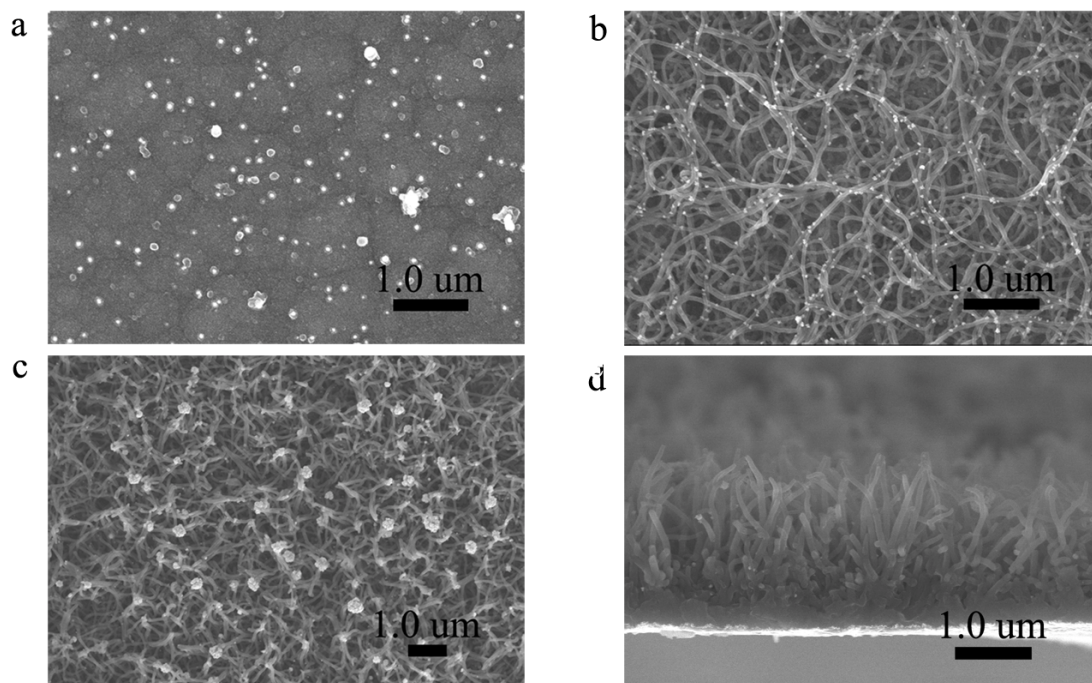


Figure S4 SEM images of samples after charge-discharge cycling: a) PPy film, b) PPy NW networks, c) & d) PPy NW arrays, which indicate their morphologies were only slightly influenced after hundreds cycling