High Performance Ambipolar Field-Effect Transistor of Random Network Carbon Nanotubes

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Supporting Information for

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Supplementary Information I. The Concentration of the Residual Polymers

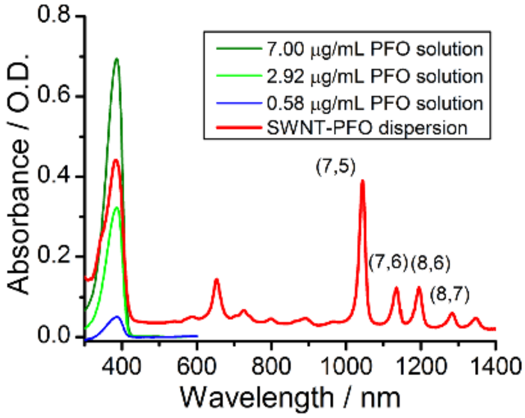

Figure S1. Comparison between the absorption spectra of the SWNT-PFO enriched dispersion used to fabricate the FETs and several PFO solutions with different concentrations. The remaining PFO concentration in the SWNT-PFO dispersion is less than 7.00 μg/mL, but slightly higher than 2.92 μg/mL.

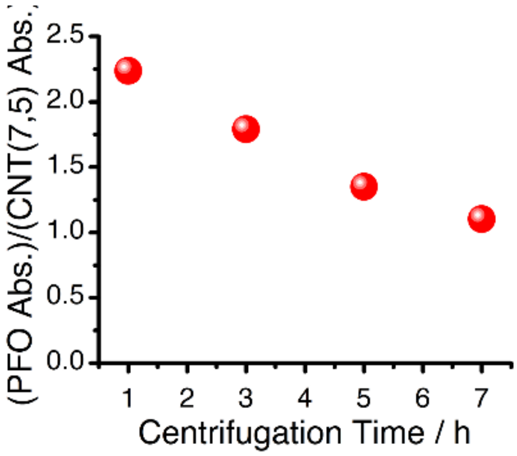

Figure S2. Ratio between the absorbance peak of the PFO and the peak of CNT(7,5) species versus the centrifugation time (second step). This plot quantifies the residual polymer amount as the function of the centrifugation time.

Supplementary Information II. Hysteresis in The Transport Characteristics

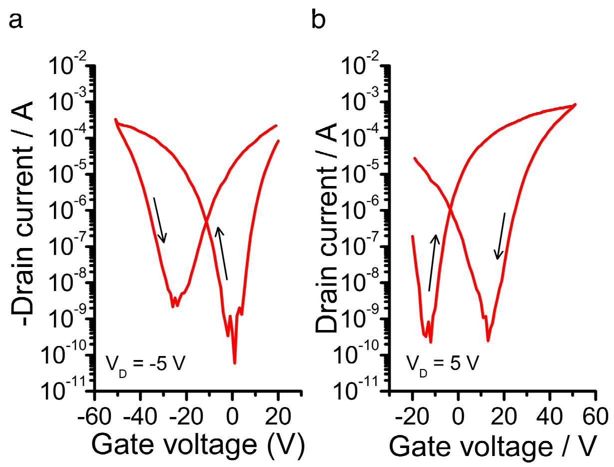

Figure S3. Plot of the forward and backward sweep I_D-V_G transfer characteristics of **(a)** p-channel operation and **(b)** n-channel operation of the ambipolar FET that show hysteresis behavior. This kind of hysteresis is normally observed in bottom gated CNT network FETs. These two plots correspond to the transfer characteristics in Fig. 2b.

Supplementary Information III. The Influence of Residual Polymer towards The Electronic Transport

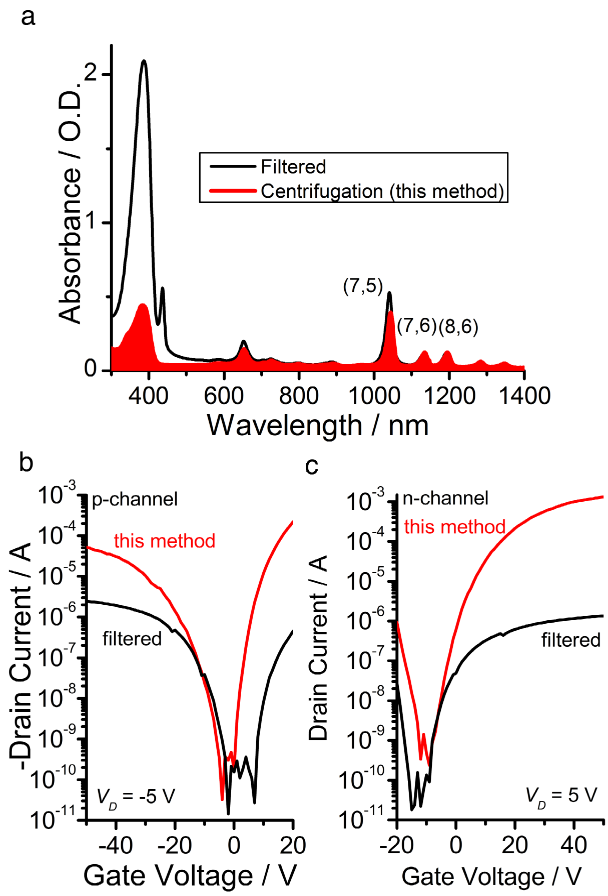

Figure S4. (a) Comparison between the absorption spectra of the enriched SWNT dispersion through ultracentrifugation (this method) and through multiple filtrations[11d]. It is obvious that the present method provides much lower residual polymer concentration, despite the similar concentration of the nanotubes. **(b)** The comparison of p-channel operation and **(c)** n-channel operation between the devices (L = 20 μm: W = 10 mm), fabricated from filtered SWNT dispersion (black line) and ultracentrifuged SWNT dispersion (present method, red line). Both holes and electron transports, both in terms of mobility values and on/off ratio, are much higher in the devices fabricated from ultracentrifuged SWNT dispersion. The values of hole and electron mobility of the filtered SWNT are 2.28×10^{-3} cm^2/V·s and 1.10×10^{-3} cm^2/V·s, respectively. The on/off ratios are in the order of 10^4 for both charge carriers.