

Supporting Information

Polymer Removal from Electronic Grade Single- Walled Carbon Nanotubes after Gel Electrophoresis

*Sara Mesgari[‡], Yin Fun Poon[‡], Yilei Wang, Ya Xuan Thong, Jing Wang, Mary B. Chan-
Park**

School of Chemical & Biomedical Engineering, Nanyang Technological University, 62
Nanyang Drive, Singapore 637459, Singapore

* Mary Chan-Park (mbechan@ntu.edu.sg)

[‡] These authors contribute equally to this manuscript

Agarose Gel Electrophoresis (AGE) procedure:

Preparation of SWNTs solution: P2 nanotubes were dispersed in an aqueous solution containing 2 wt % of CS-A as dispersant using probe sonication (SONICS, VCX-130) at 100 W in a water-ice bath for 3 h and then centrifuged (Sartorius, SIGMA@3K30) at 50,000 g for 1 h to remove SWNT bundles. The supernatant was then collected for use in AGE.

Gel Electrophoresis: the agarose gel was made by adding 1 wt % agarose to 0.2 wt % CS-A in 2× transport buffer (TB) buffer solution (50 mM tris hydroxymethyl aminomethane, 48.5 mM boric acid, pH 8.2). The agarose gel solution was then melted by heating in a microwave oven and used to fill about 2/3 of the sample container of the gel electrophoresis apparatus (a 0.3 cm wide space sandwiched by 2 glass plates (20 cm by 20 cm)). The sample was then cooled at room temperature to form the gel. The remaining 1/3 of the sample container was filled with a mixture of SWNT solution and agarose solution prepared by mixing about 20 mL of the previously prepared SWNT solution with an equal amount of 2 wt % agarose solution and then melting the resultant mixture by heating in a microwave oven. The sample was next placed in the gel electrophoresis apparatus (PROTEAN II XI, Bio Rad Laboratories, Singapore) filled with the 2× TB buffer solution and was subjected to electric field at 200 V for about 4 h.

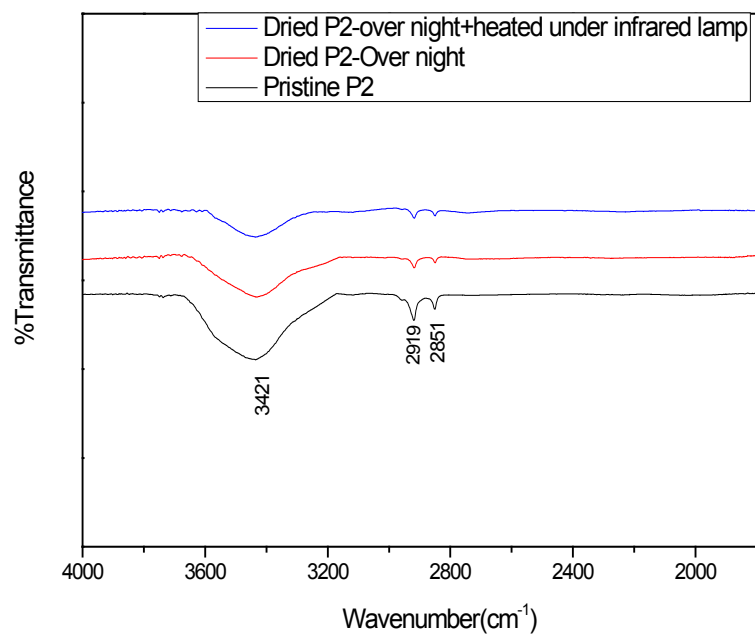
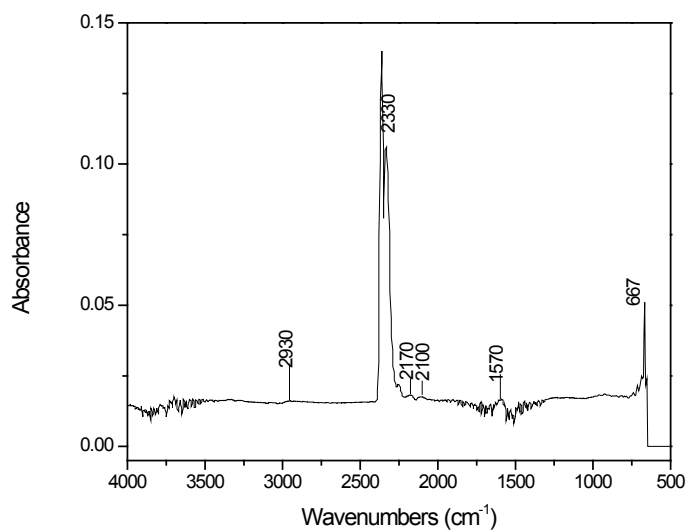
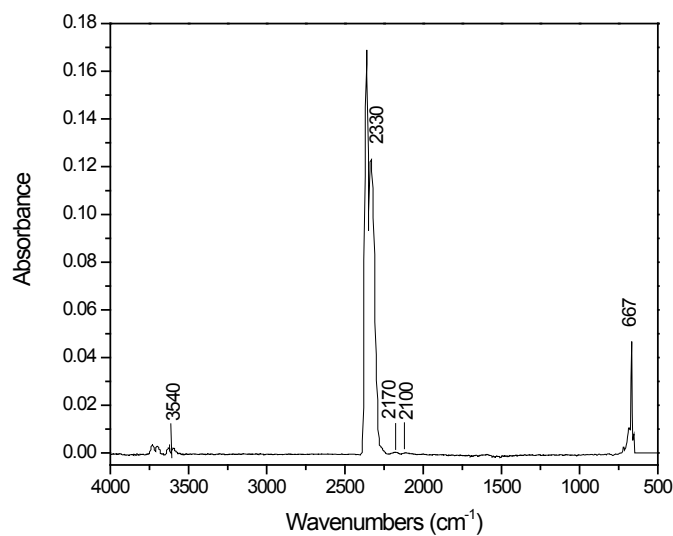


Figure S1. FTIR spectra of pristine P2 in different conditions after drying over night and heating under infrared lamp.

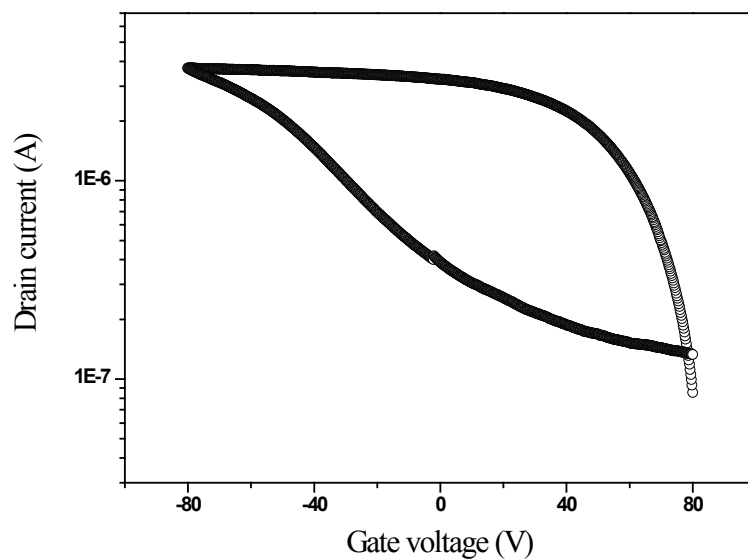


(a)

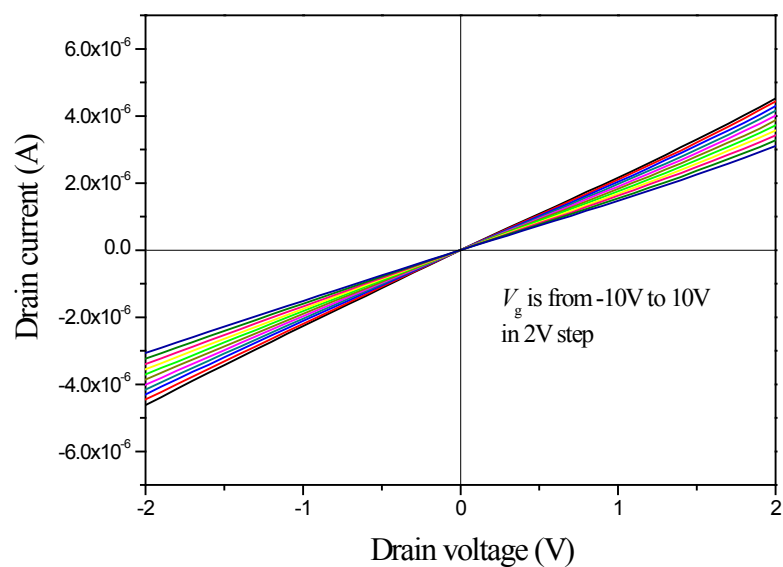


(b)

Figure S2. Enlarged FTIR of the gases evolved from (a) *a*-SWNTs-3d at 436°C and (b) *b*-SWNTs at 330°C.



(a)



(b)

Figure S3. (a) Drain current (I_d) versus gate voltage (V_g) plot of a representative FET (with on/off ratio of about 4.3×10^1) made with *p*-SWNTs at $V_{ds}=0.3$ V. (b) Typical output

characteristic (drain current (I_d) versus drain voltage (V_d)) of a representative FET made with *p*-SWNTs at gate voltages from -10V to 10V in 2V steps.

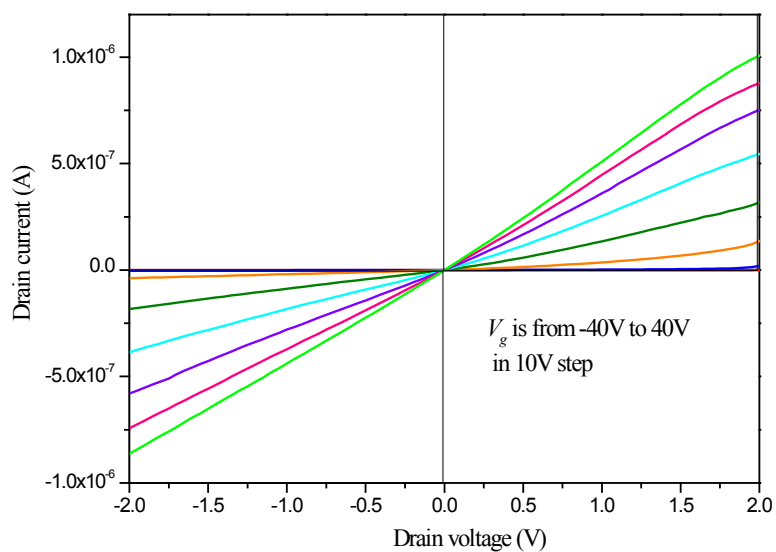


Figure S4. Typical output characteristic (drain current (I_d) versus drain voltage (V_d)) of a representative FET made with annealed *b*-SWNTs at gate voltages from -40V to 40V in 10V steps.