

Electronic Supplementary Information

Selective Synthesis of Large Diameter, Highly Conductive and
High Density Single-Walled Carbon Nanotubes by Thiophene-
Assisted Chemical Vapor Deposition Method on Transparent
Substrates

Jinghua Li,^a Keigo Otsuka,^{a, b} Xiao Zhang,^a Shigeo Maruyama,^b and Jie Liu^{*a}

^a Department of Chemistry, Duke University, Durham, NC 27708, United States

Email: j.liu@duke.edu

^b Department of Mechanical Engineering, the University of Tokyo, 7-3-1 Hongo, Bunkyo-ku,
Tokyo 113-8656, Japan.

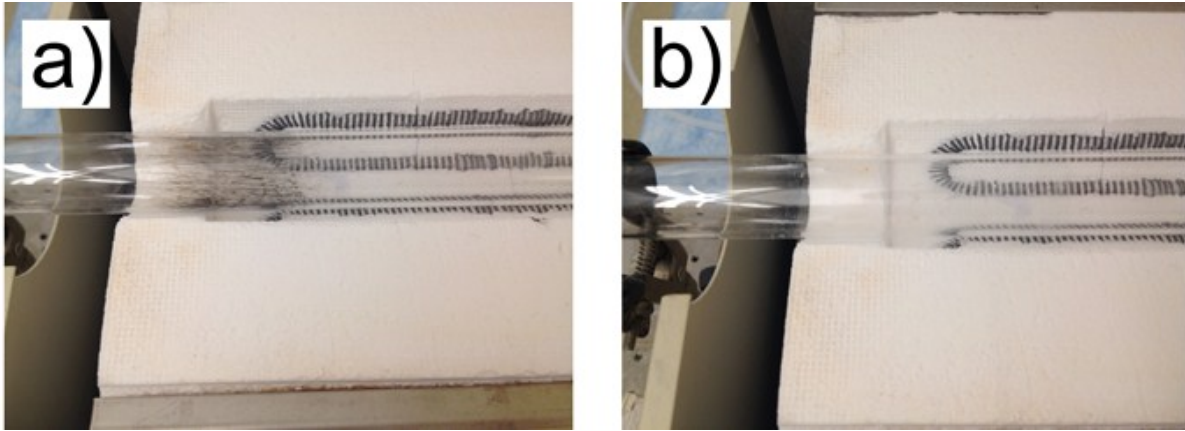


Fig. S1. Downstream of the quartz tube after SWNT growth using thiophene-assisted method (a) and normal CVD method (b).

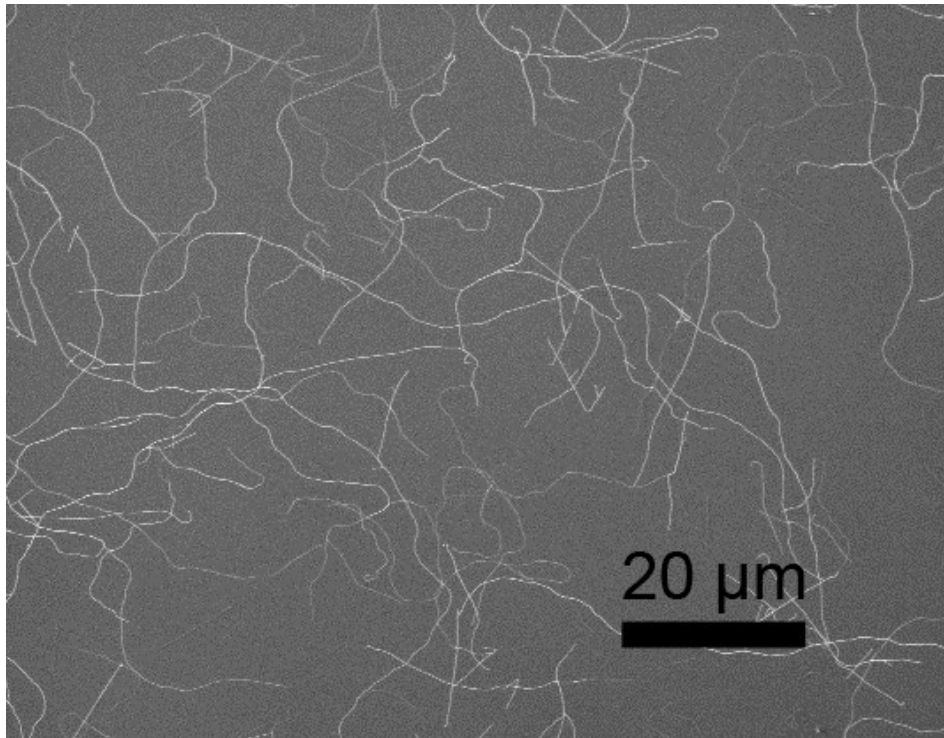


Fig. S2. SEM image of SWNTs prepared under the same growth condition as in Fig. 1b but without thiophene.

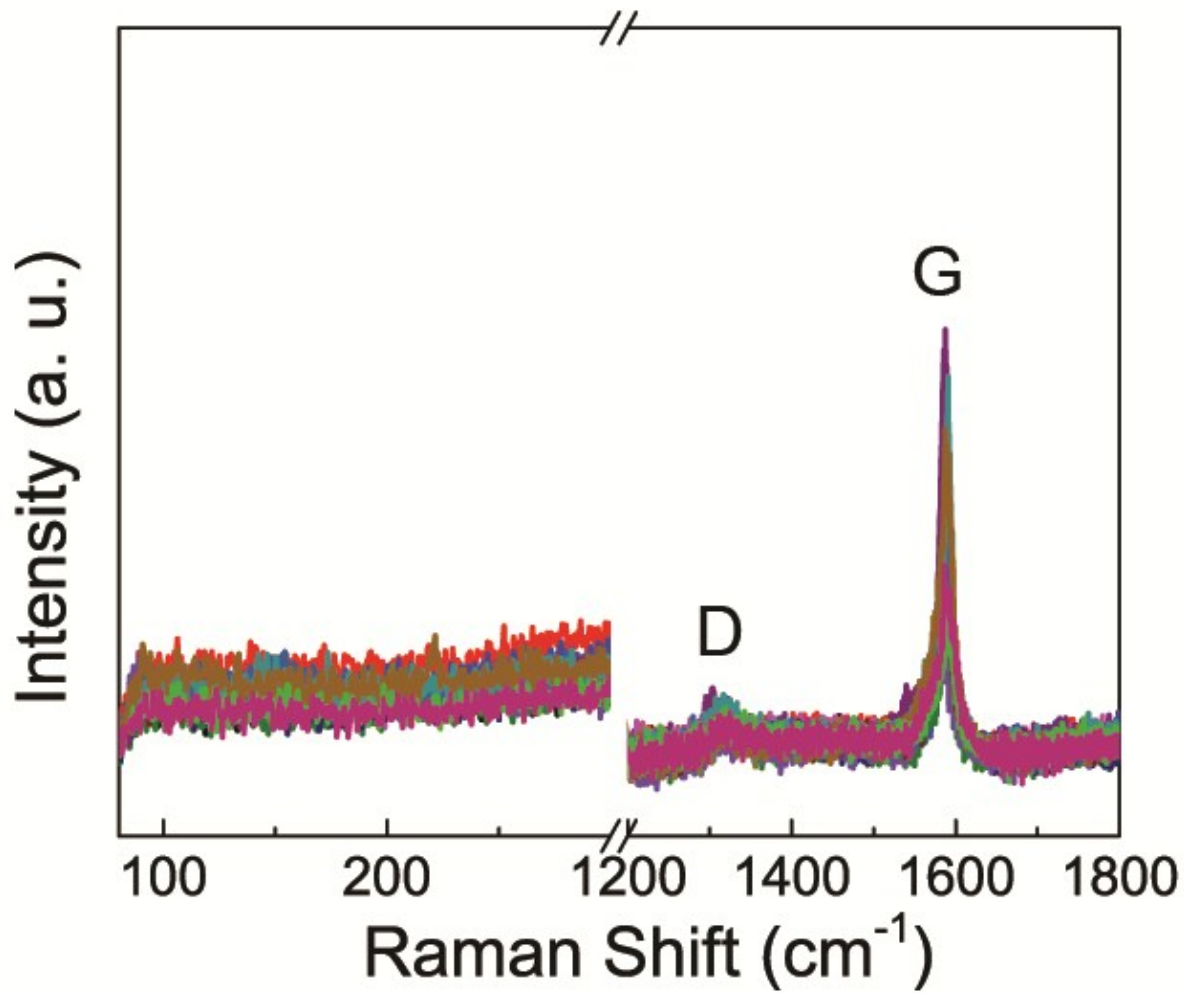


Fig. S3. Raman spectra collected from individual SWNTs showing D bands and G bands. The excitation laser wavelength is 633 nm.

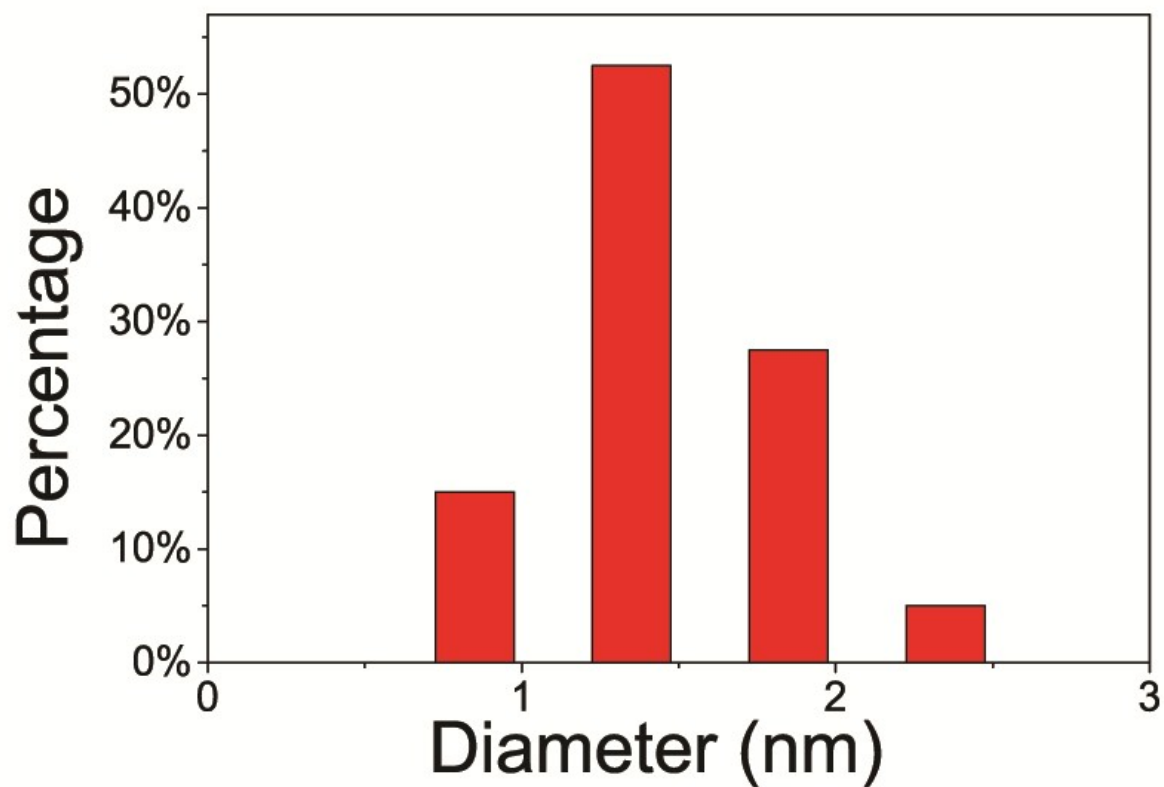


Fig. S4. Diameter distribution of SWNTs synthesized under the same growth condition as in Fig. 3c but without thiophene. The average and standard deviation are 1.43 and 0.34 nm, respectively.

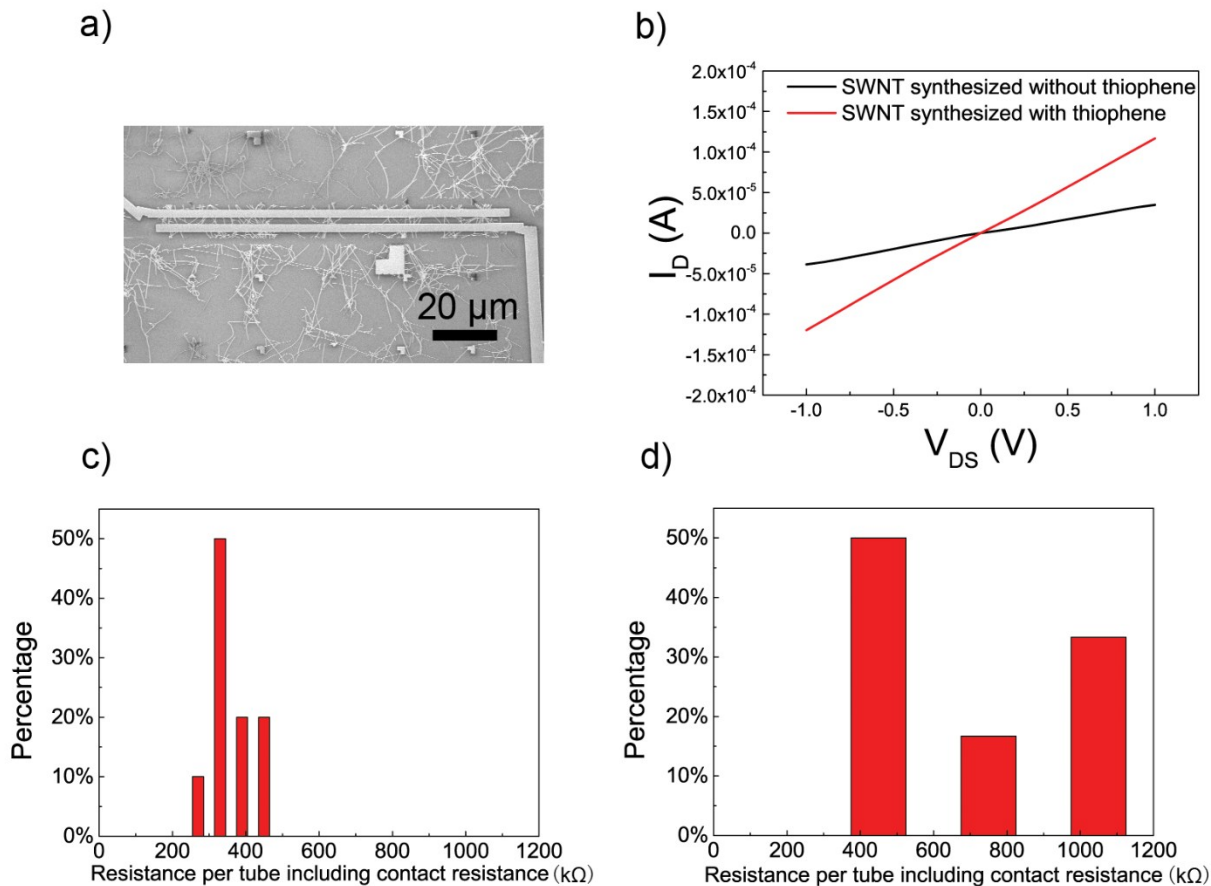


Fig. S5. (a) SEM image of a representative multi-SWNT device with the channel length of 2 μm . (b) Output characteristics of two representative devices based SWNT prepared by the normal CVD method (red) and the thiophene-assisted CVD method. The two devices contain the same number of SWNTs. (c, d) Histograms of the per-tube resistance (including contact resistance) distribution of devices based on SWNTs made by the thiophene-assisted CVD method (c) and the normal CVD method without thiophene.

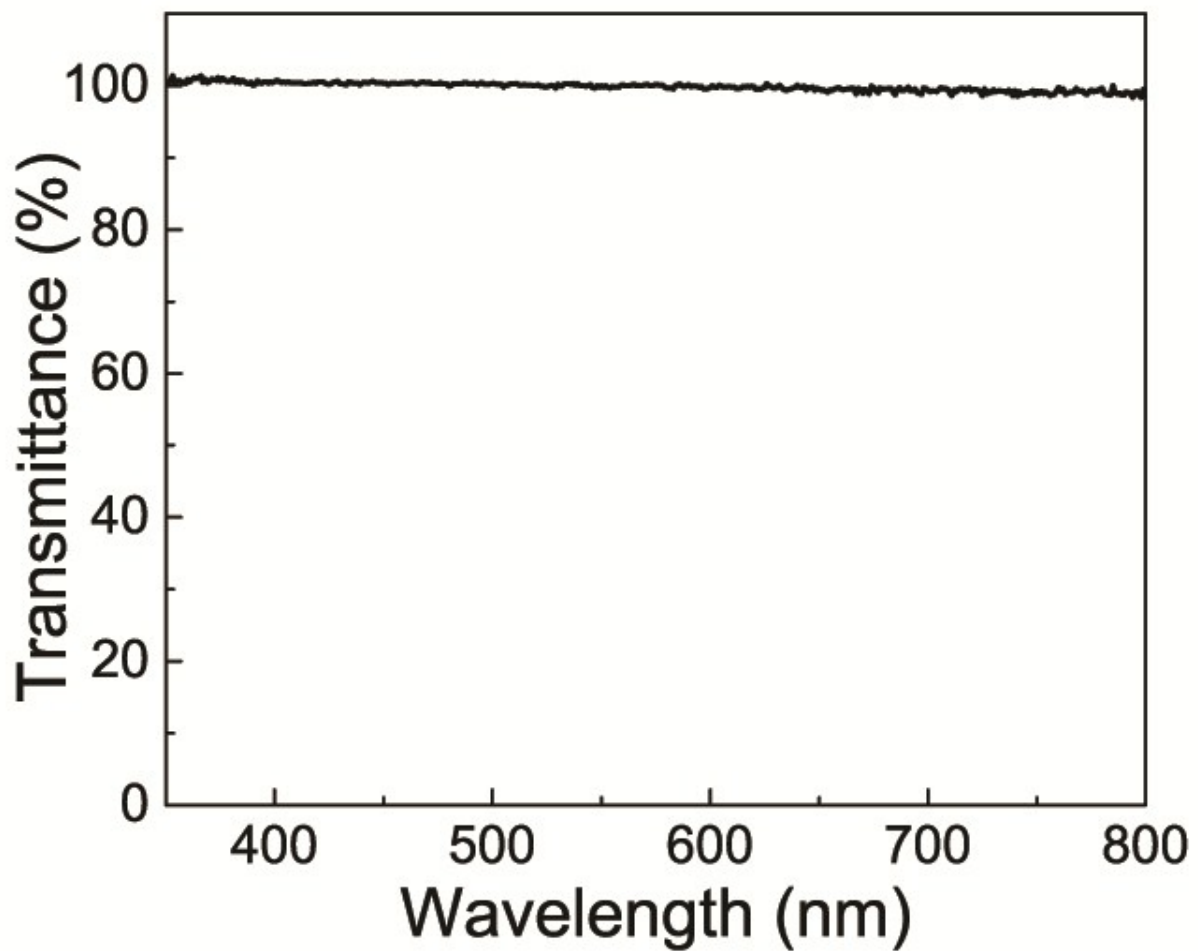


Fig. S6. Optical transmittance spectrum of SWNT thin film prepared by thiophene-assisted CVD method after the multi-cycle growth. A blank substrate was used as the reference.