Materials and Methods

Carbon nanotube synthesis. CVD was carried out on a one inch diameter (15 inch long heating zone, Lindberg Blue) quartz tube furnace. Water vapour was supplied by passing a portion of the carrier gas through a water bubbler. The water concentration was measured by a water-monitor directly connected to the exhaust line. Pure Ar (99.9999%) or He (99.9999%) with 40% H_2 (99.99999%) (total flow 1000 cm^3 STP per minute) was used as a carrier gas at one atmosphere with a small and controlled amount of water vapor supplied from the water bubbler. CVD growth was carried out using pure ethylene (99.999%) as the carbon source. Various catalysts known to provide SWNTs (Fe nanoparticles (1) by $FeCl_3$, sputtered metal films (Fe (1 nm), Al(10 nm)/Fe(1 nm), Al_2O_3 (10 nm)/Fe(1 nm), to Al_2O_3(10 nm)/Co(1nm)) were deposited on Si wafers, quartz, or metal foils and placed in a furnace. Typical CVD growth was carried out at 750°C with ethylene (10-150 cm^3 STP per minutes) and water concentration of 20 ppm to 500 ppm for 10 min as the standard growth time. The best matching water concentration depended significantly on experimental conditions such as growth temperature, ethylene flow rate, catalyst, and the furnace. For the SWNT forest with height of 2.5 millimeter shown in Fig. 1a, Al_2O_3 (10 nm)/Fe(1 nm) catalyst was deposited on a silicon wafer with SiO_2 of 600 nm thickness, and CVD growth was carried out at 750°C for 10 minutes with 100 sccm ethylene and water concentration of 175 ppm.

S1. H. Choi, *et al.*, *Nano Lett.* **3**, 157 (2003).

Supporting Figures (Figs. S1 and S2)

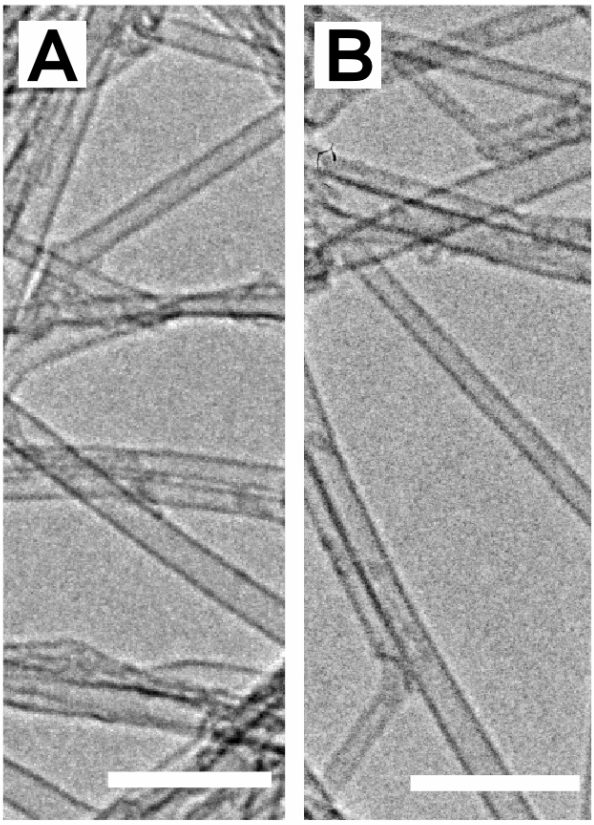

Fig. S1. High resolution TEM images of the SWNT of the forest**. (A and B)** TEM images showing a couple of individual SWNTs. Scale bars: 10 nm**.**

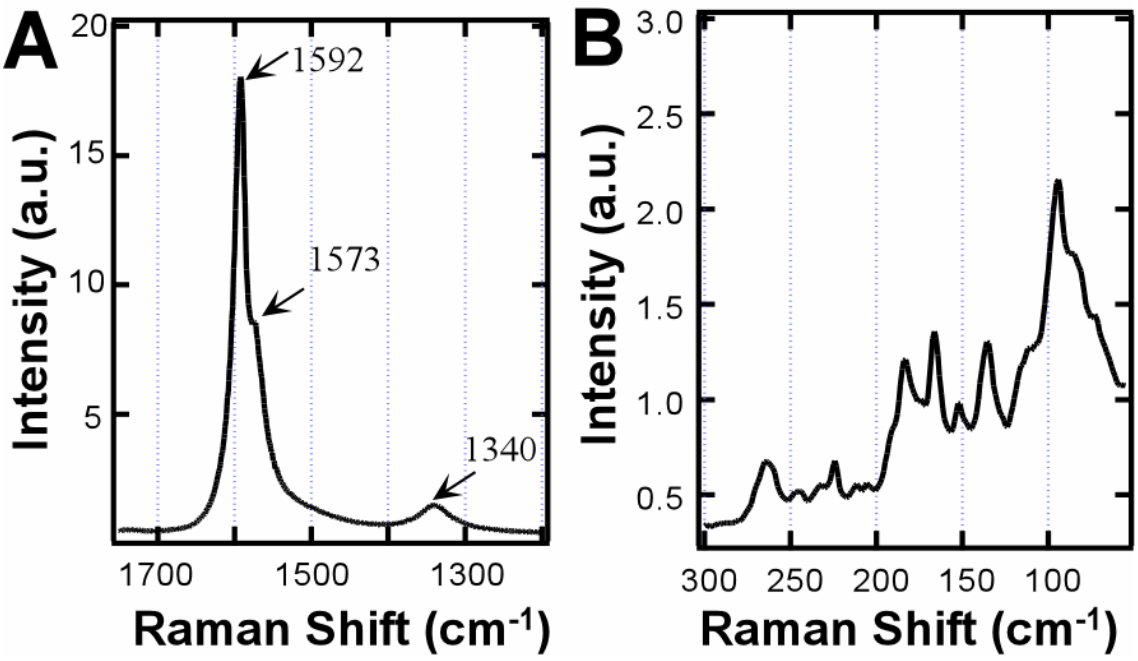

Fig. S2. (A) Tangential modes in Raman spectra of the SWNT forest. **(B)** Radial breathing modes in Raman spectra of the SWNT forest.