

Supporting information

Experimental part

Materials and instruments. Ferrocene were purchased from Sigma. Carbon fiber comes from carbon cloth textile (GC-14, Electrolytica, Amherst, NY). Commercial multi-walled carbon nanotubes (d=8-15 nm) were obtained from Cheap Tubes Inc. Carbon fiber powder was extracted from the carbon felt purchased from Alfar. CNTs were produced in a microwave oven (GE Appliicance, 1000 Watt).

Synthesis of carbon nanotubes. All the material obtained in this work was produced with the aid of a conventional domestic microwave oven operating at 2.45 GHz (12 cm wavelength) with 1000 Watt power. 80-100 mg of ferrocene powder was put in a glass vial and 3-4 cm of carbon fiber stands on the powder, which was then sealed with lid, and heated under microwave irradiation for 15~20 sec.

Purification of carbon nanotubes. To remove the Fe and other nanostructured carbon except CNTs, 112 mg of black powder was sonicated in 20 mL of 2M HCL solution for 2 h to remove the large amount of Fe, and then, after filtration, the black powder was further refluxed in 20 ml of concentrated HNO₃, at 100 °C for 6 h.

Characterization. The morphology was studied with FESEM (FEI Magellon 400, Japan) and transmission electron microscopy (JEM-2000FX, JEOL, Japan). High resolution TEM image was obtained by using a 200 kV Tecnai F20 STEM electron microscope. For further characterization of the structure and crystallinity of the CNTs, WAXD and Raman spectroscopy were used. WAXD was recorded on a Shimadzu XRD-6000 diffractometer using Cu K α radiation ($\lambda=1.542$ Å) at a generator voltage of 45 kV and a current of 40 mA. Micro-Raman spectroscopy was used with an excitation wavelength of 632.8 nm of a He–Ne laser. Thermogravimetric analysis was performed on a TA Instruments TGA Q50 V20 Thermogravimetric Analyzer. Samples were analyzed in platinum pans at a heating rate of 10 °C/min to 900 °C in an atmosphere of air, flowing at 60 mL/min.

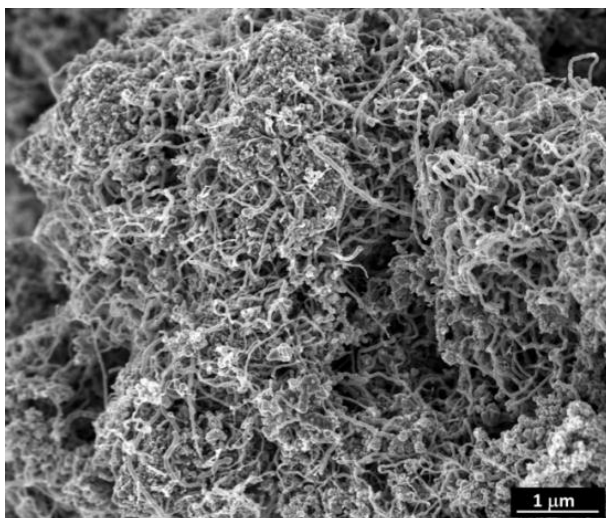


Figure S1. SEM images of formed black powder after 15s irradiation with commercial carbon fiber as the microwave absorbers.

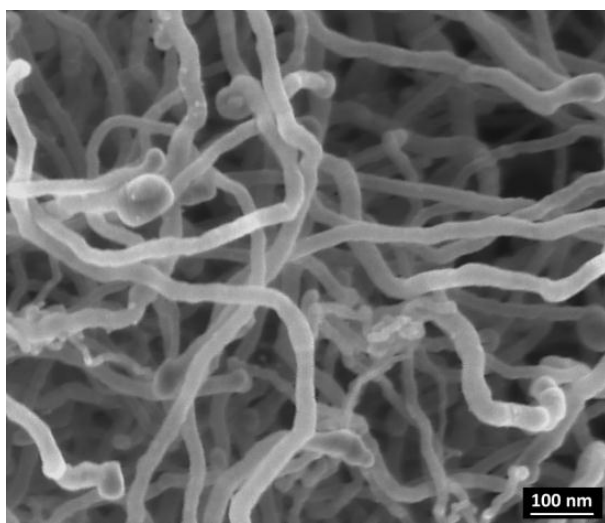


Figure S2. High magnification SEM image of the formed black powder after 20s irradiation.