

Supplementary Material for

Direct fabrication of single-walled carbon nanotube macro-films on flexible substrates

Hongwei Zhu and Bingqing Wei*

Department of Mechanical Engineering, University of Delaware, Newark, DE 19716

* Author to whom correspondence should be addressed. E-mail: weib@udel.edu

1. Materials and Methods

Here, ferrocene is directly used as carbon source as well as catalyst. The growth conditions that influence the growth of SWNTs include the growth temperature, flow rate of buffer gas (argon) and Fe: S ratio. The growth should be carried out at a suitable temperature range. Lower growth temperature (<1000 °C) will increase the size of catalytic particles and lead the formation of MWNTs and nanofibers. Higher growth temperature (>1200 °C) will generate a large amount of pyrolytic carbon. A fast flow of argon (1000~2000 mL/min) is generally needed to reduce both the carbon and catalyst concentration in the reactor and hence to prevent SWNTs from growing up to MWNTs. The addition of sulfur in the precursor system is to form an active site for the SWNT nucleation. However, higher concentration sulfur will become a catalyst poison and gives no nanotubes growth. The nanotubes can be controlled to be single-walled by optimizing these parameters: the growth temperature is set in the range of 1100 ~1150°C; the flow rate of argon is set at 1500 mL/min; the Fe: S molar ratio is set at 10: 1.

2. Figures

Supplementary Material (ESI) for Chemical Communications

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Figure S1 The schematic of the CVD setup.

Figure S2 SWNT macro-films deposited on various substrates.

Figure S3 Cutting and punching.

Figure S4 TEM images of SWNTs.

3. Movies (were included in the first submission and nothing changed)

Movie S1 As-deposited SWNT film showing a perfect structural uniformity and flexibility.

Movie S2 As-deposited SWNT film with a hydrophobic surface.

Movie S3 As-deposited SWNT film showing good affinity with ethanol.

Figure S1

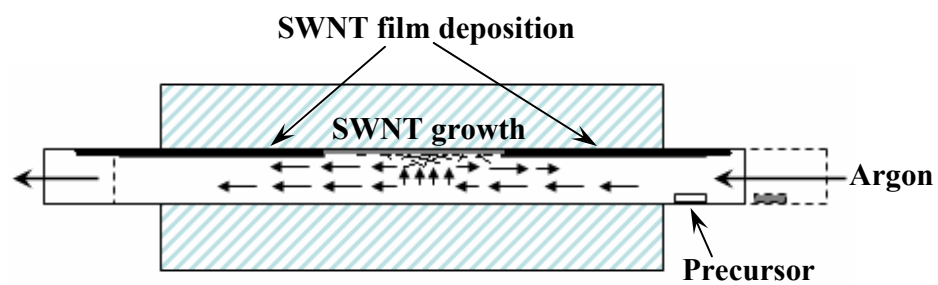


Figure S2

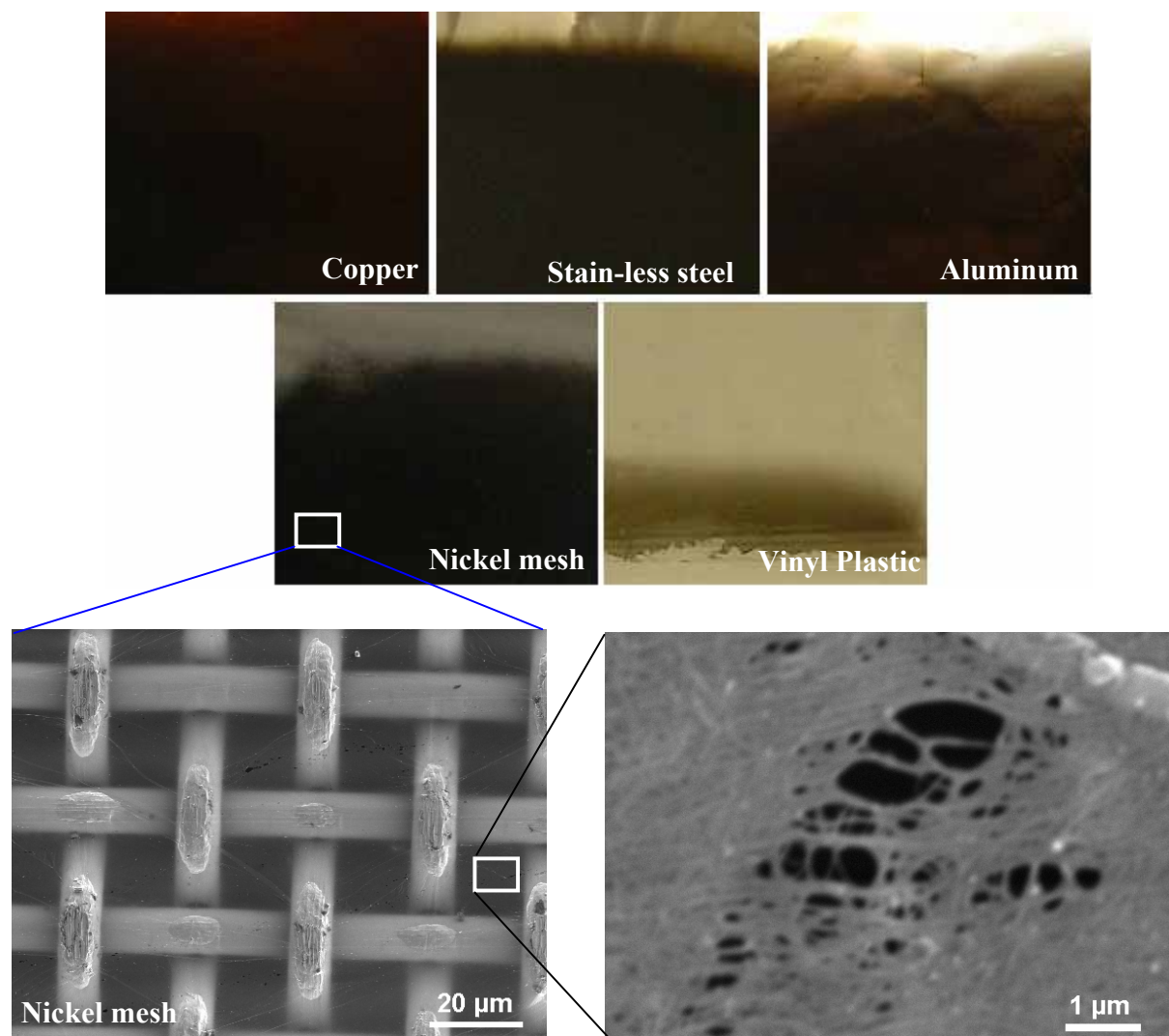


Figure S3



Figure S4

