

I wish I were here

Liming Dai

This is My Story

Subject: NT06 -- Liming Dai -not able to give
invited talk, and asking for a substitute
Date: Thu, 22 Jun 2006 23:30:44 +0900
From: Quanbin Dai

Dear David,

Nice to catch up with you. Many thanks for your email. My flight to Tokyo was canceled twice on yesterday and tonight because some problem with the airplane. I think initially the airline thought that the problem could be fixed yesterday so that we were asked to **come back to the airport early this morning (4:00am) to reboard for Tokyo.**

But, it turned out the **problem remained**. We then were rescheduled for all different airlines and different flights within next several days. I was rescheduled for a flight to Tokyo tomorrow and will arrive in Nerita at 2:00pm on June 23. It seems there is no way I can catch my talk at 3:00pm.

But, I can come from Tokyo to meet you and others on Saturday, if you will still stay in that hotel and you will have some spare time. Under these circumstances, I asked the hotel in Nagano to cancel all of my room reservations - I will not stay in the Nagano hotel either even if I will come. As discussed, attached please find a pdf copy of my presentation. My colleague Dr. Toshi Ohiasi can help me to cut the pdf slides and past them into new powerpoint templates, if he and/or someone else can make the presentation for me.

I know all of you are very busy and am grateful to you all for your precious time and for your much-needed help. Sorry for all of the inconvenience this have caused. Thank!

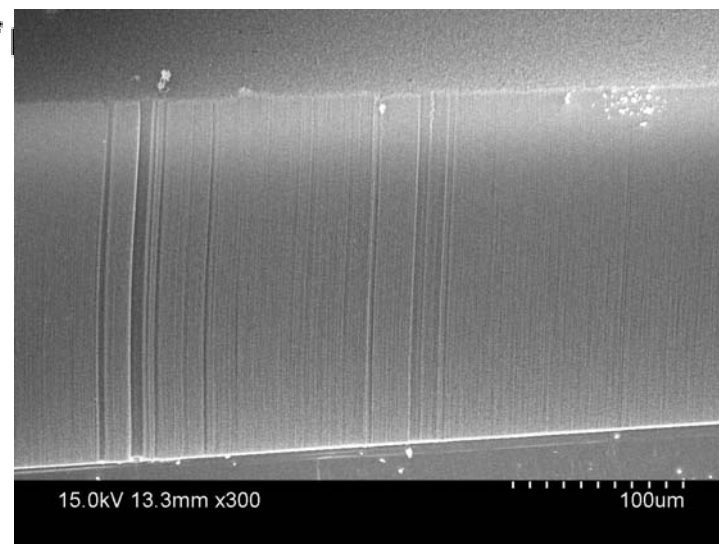
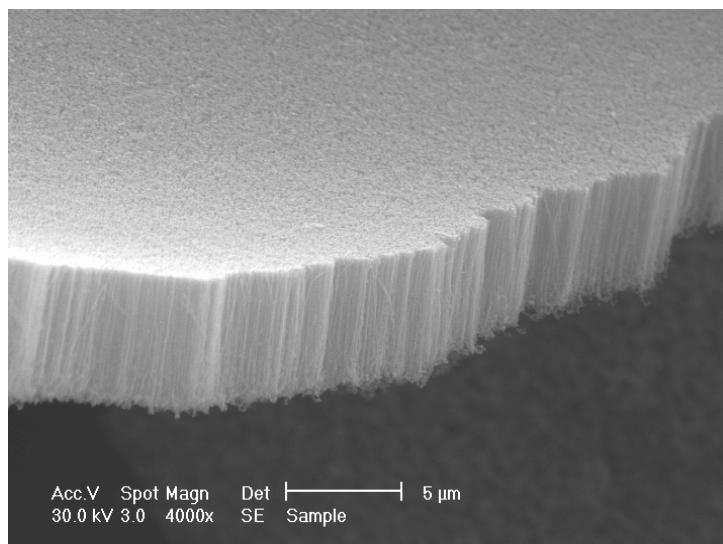
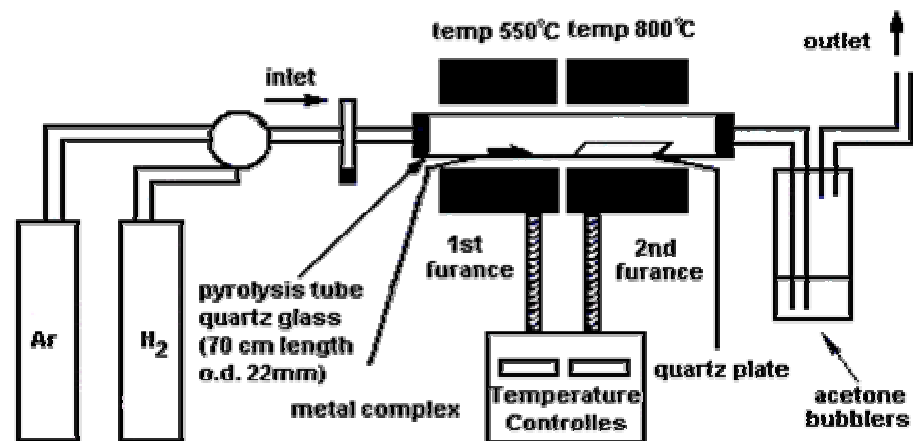
Hope a very successful conference, which I have been so much looking forward to attending!!!

I should stay in touch. With my best personal regards,

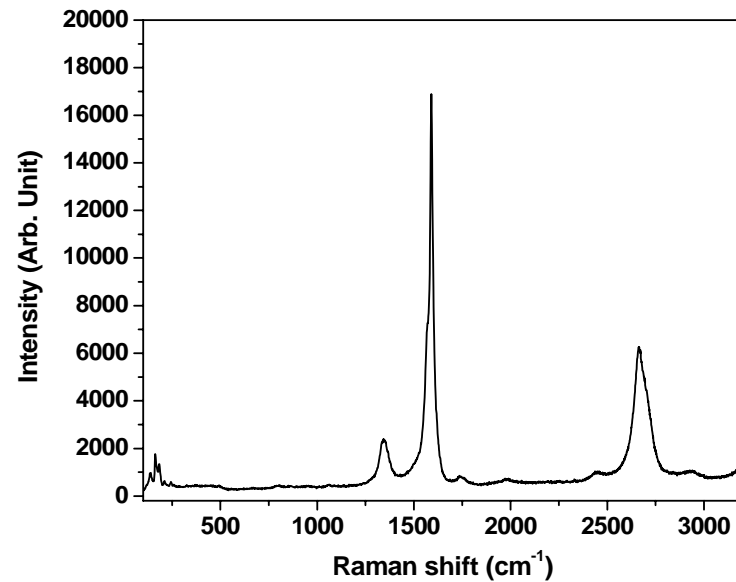
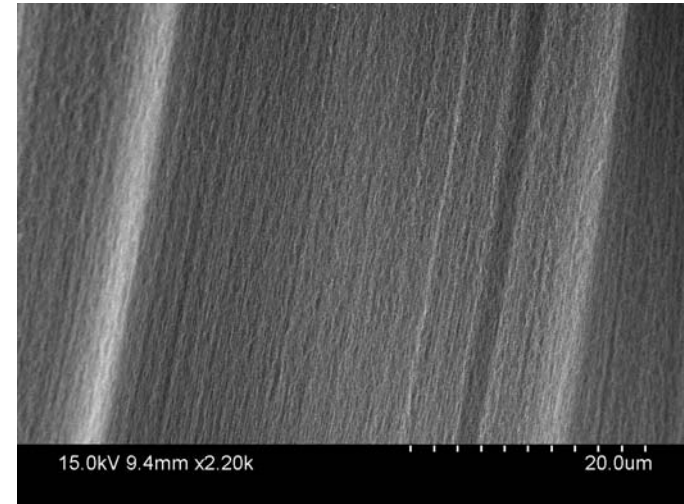
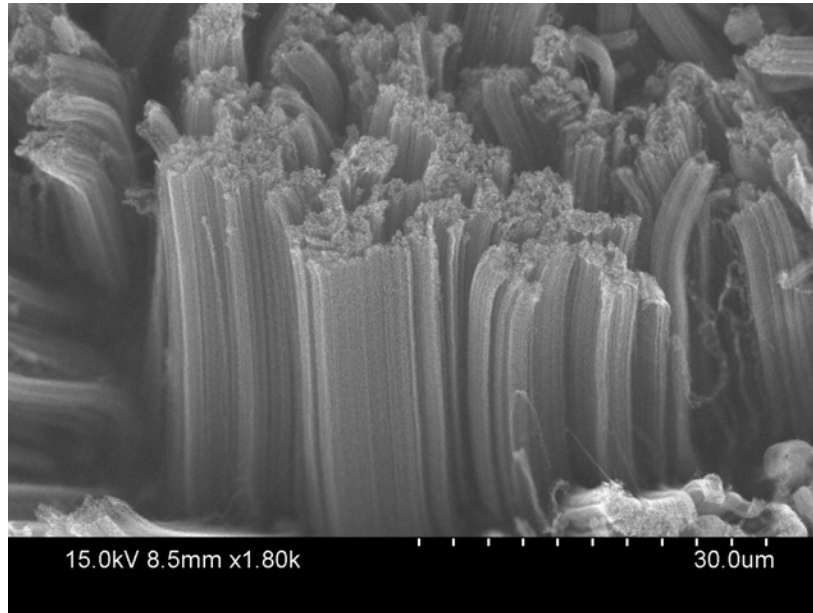
Liming

I am NOT Liming Dai, but can present the talk
silently now. Please forgive my not speaking loud.

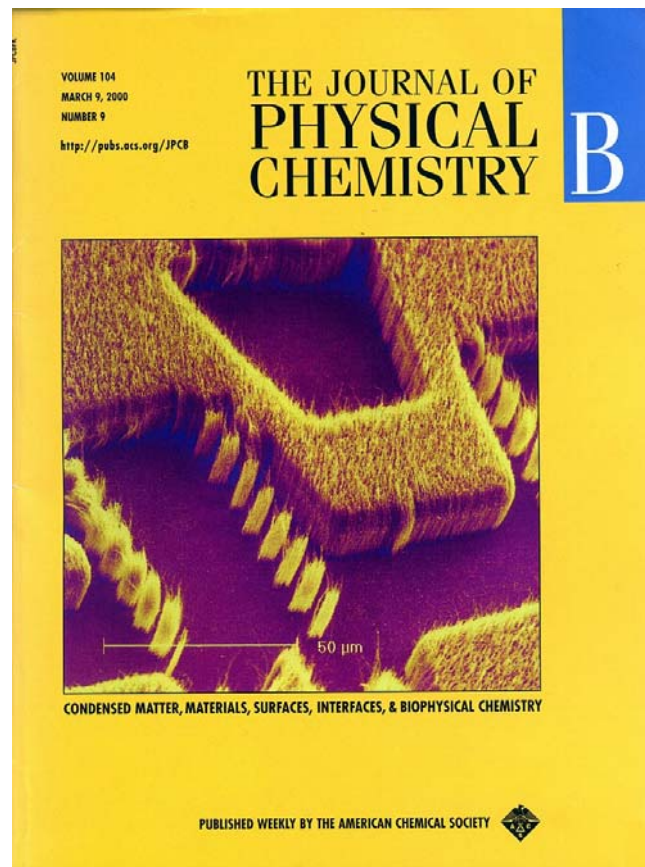
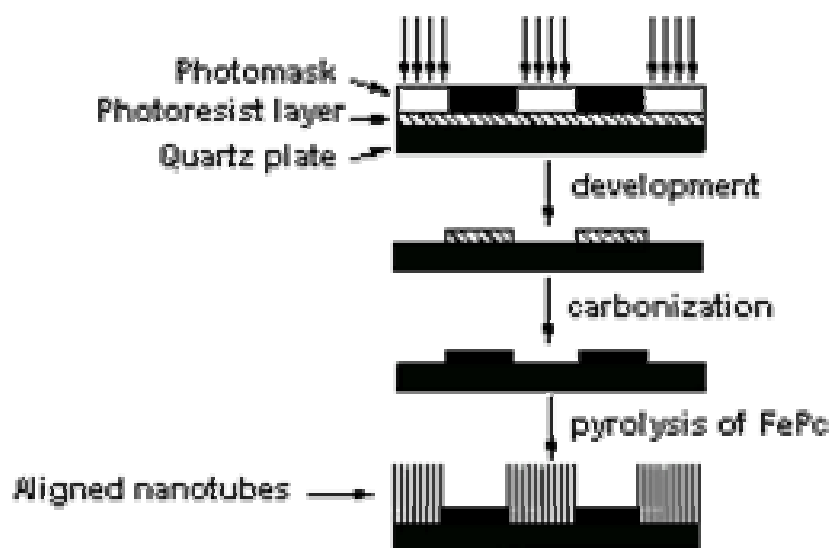
Aligned Multi-Walled Carbon Nanotubes



Aligned Single-Walled Carbon Nanotubes



Photolithographic Growth of Carbon Nanotubes



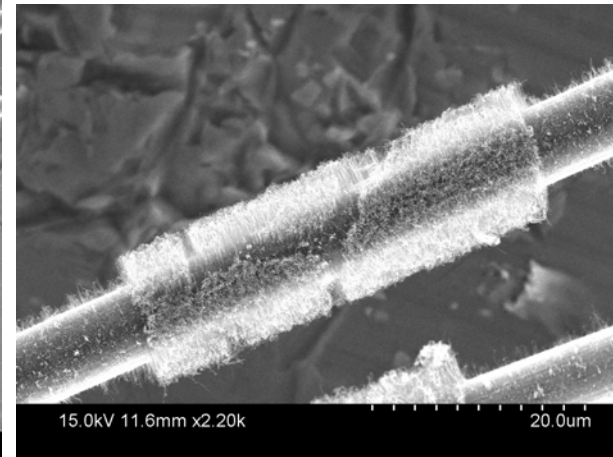
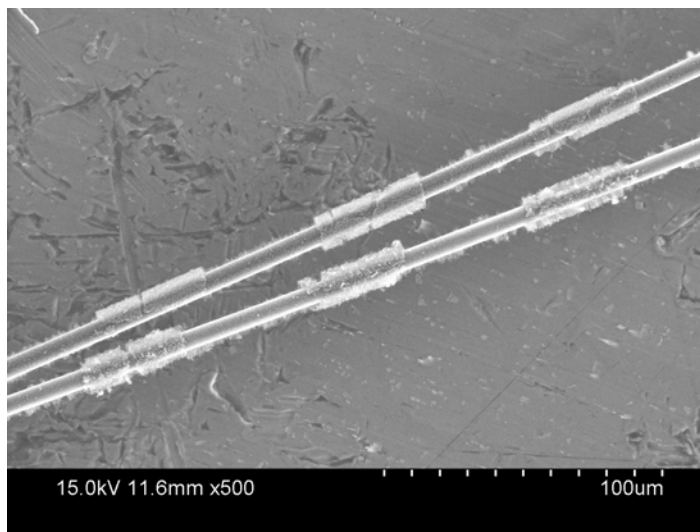
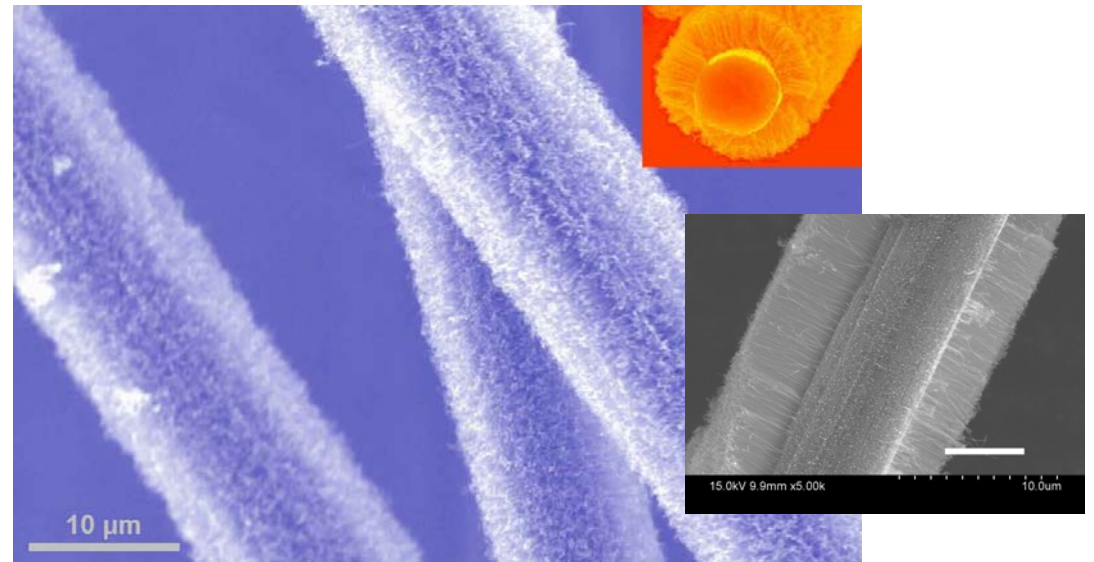
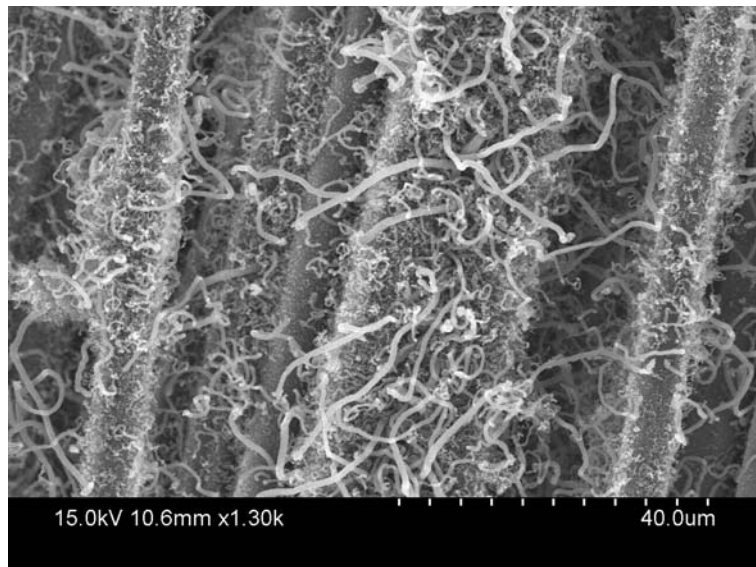
Dai, *et al. JPCB*. **2000**, *104*(9); *JACS* 1999, *121*, 10832.

Towards Multicomponent Carbon Nanotube Micropatterns

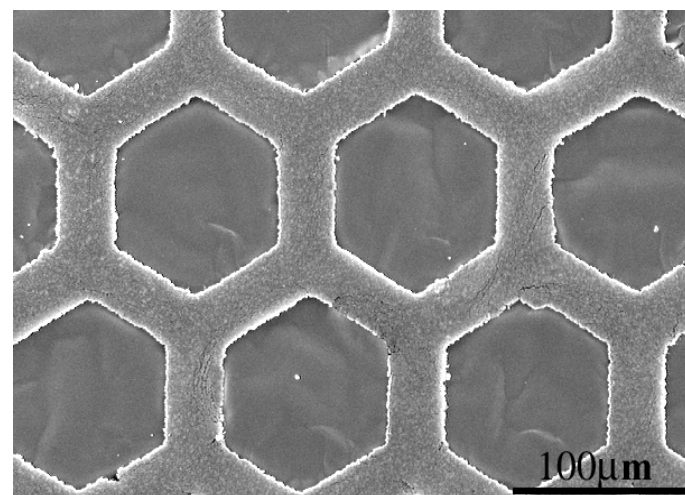
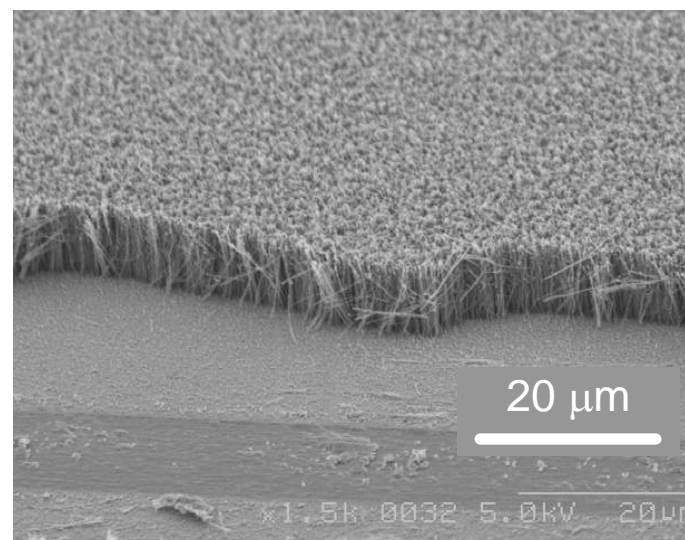
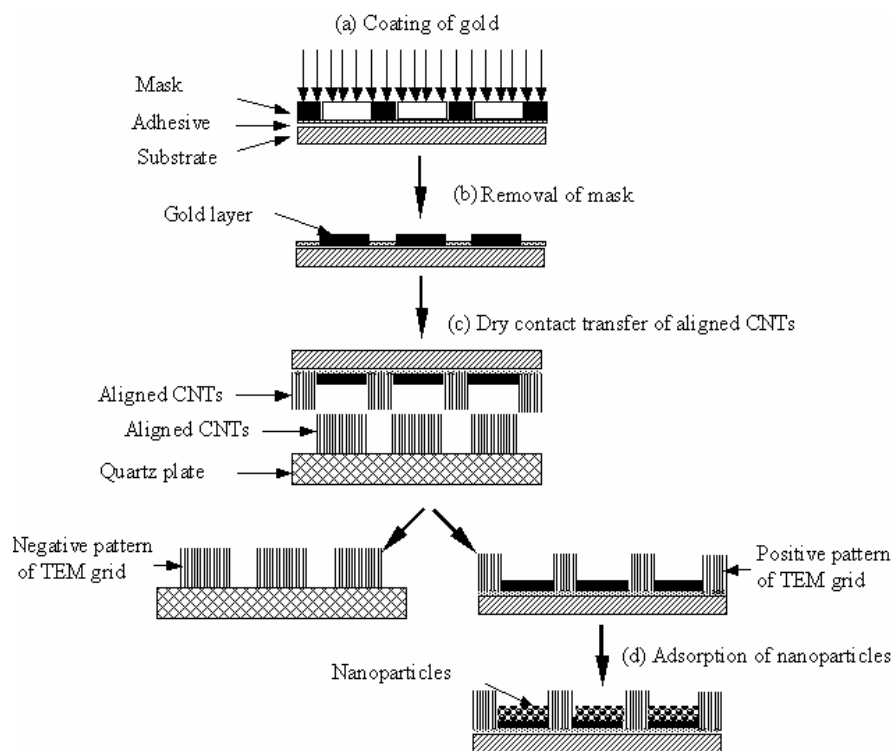


Huang, *et al.*, *J. Phys. Chem. B* **2000**, 104, 2193. *Nanotechnology* **2003**, Vol.14(10). *Plasma Proc. Polym.* **2005**, Vol.2(4).

Growth and Patterning of Carbon Nanotubes On Carbon Microfibers

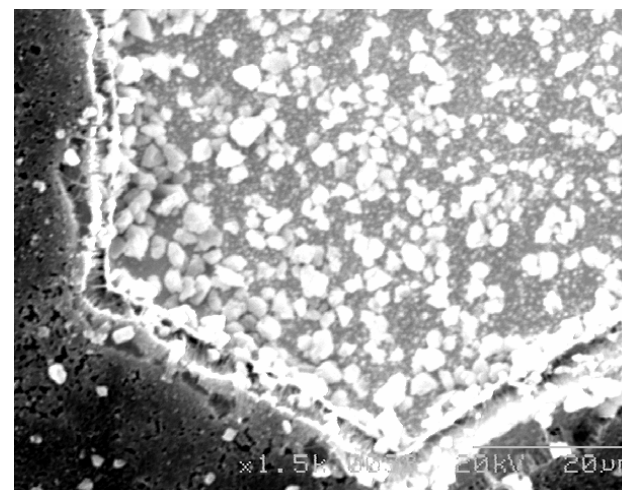
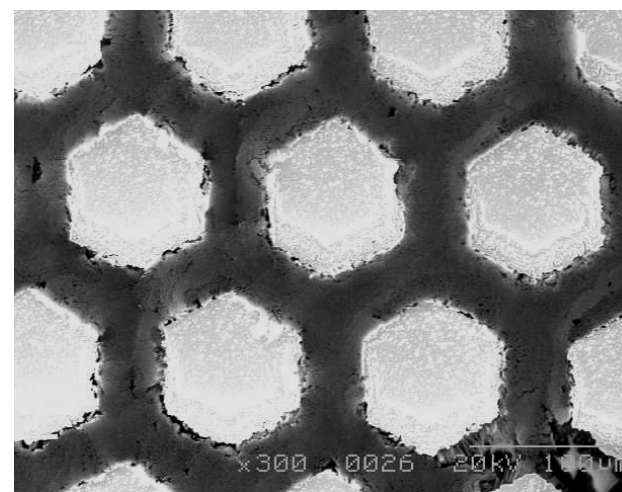
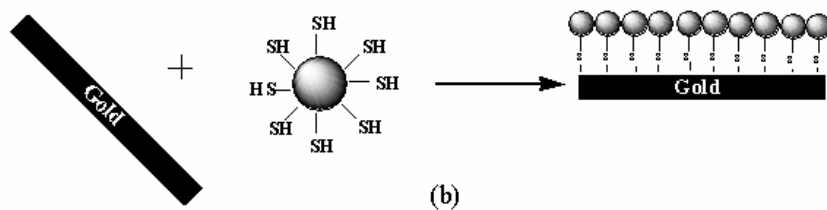
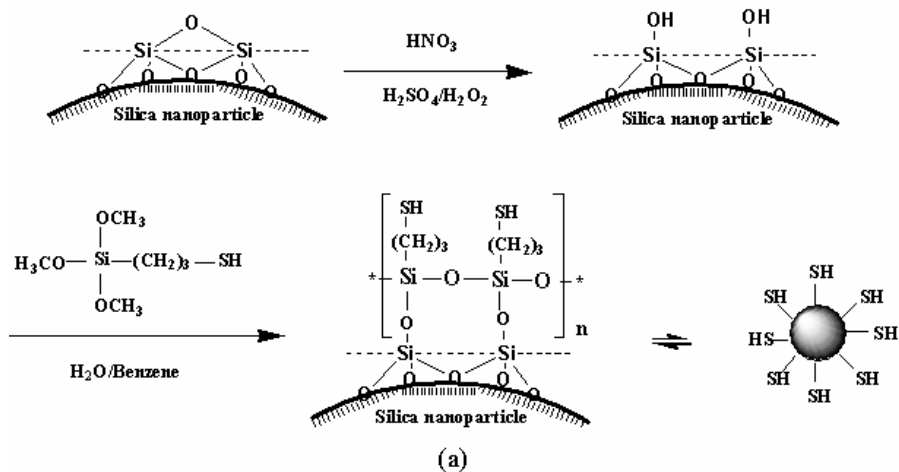


Multicomponent Interposed Aligned Carbon Nanotube Micropatterns

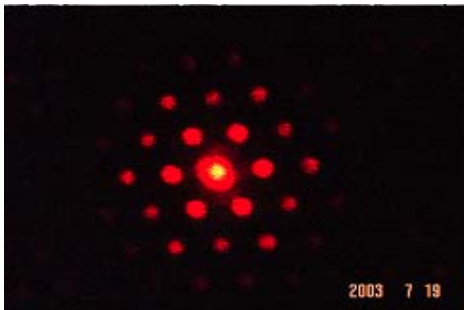
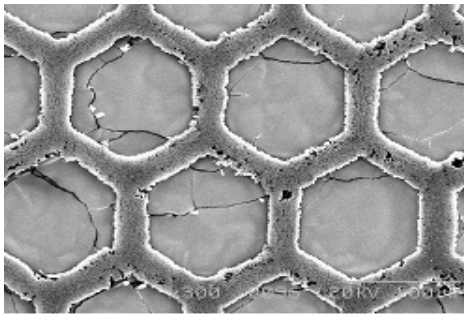


Yang, Vaia & Dai *J. Phys. Chem.* **2003**, 107, 12387.

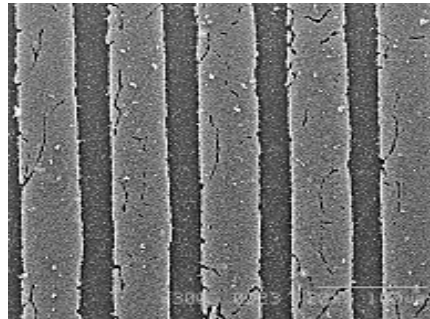
Multicomponent Interposed Aligned Carbon Nanotube Micropatterns



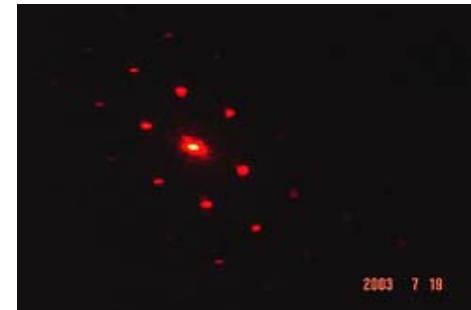
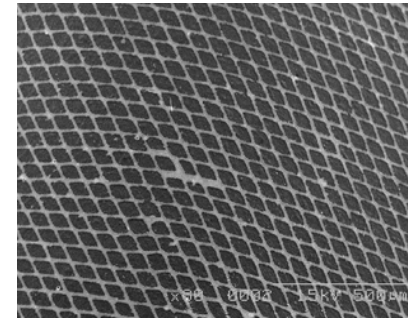
Optical Diffractions from Aligned Carbon Nanotube Micropatterns



(a)

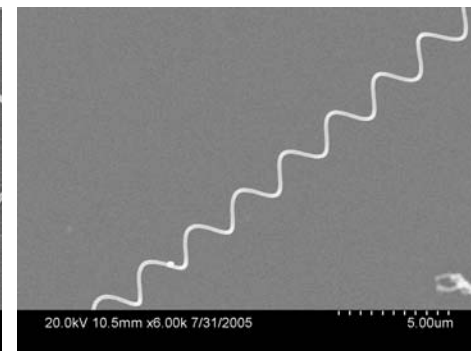
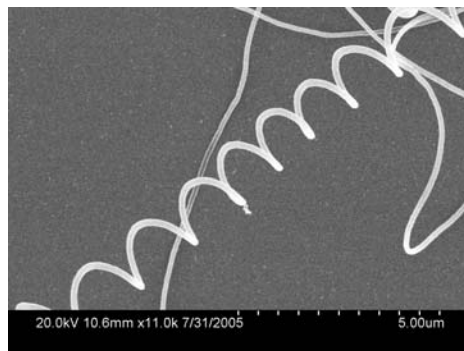
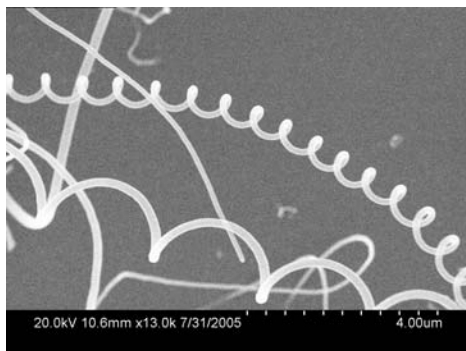
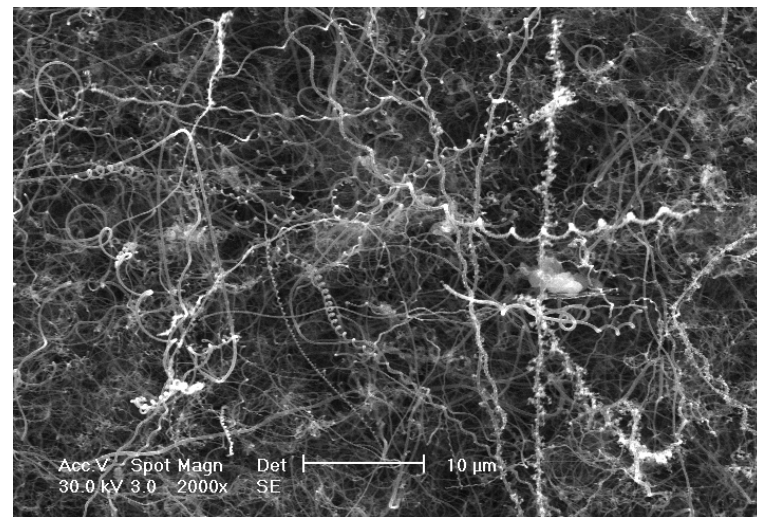
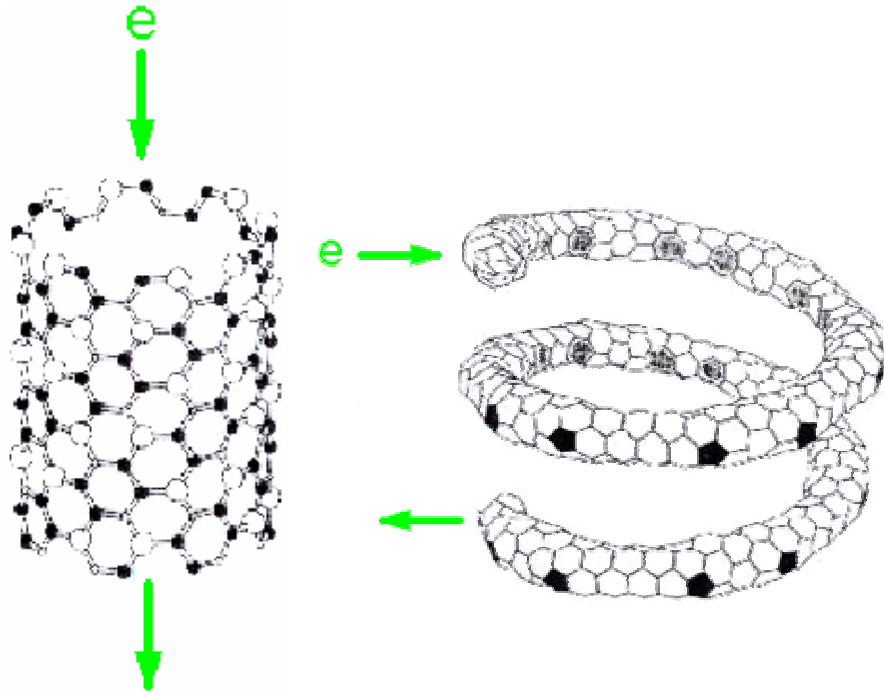


(b)

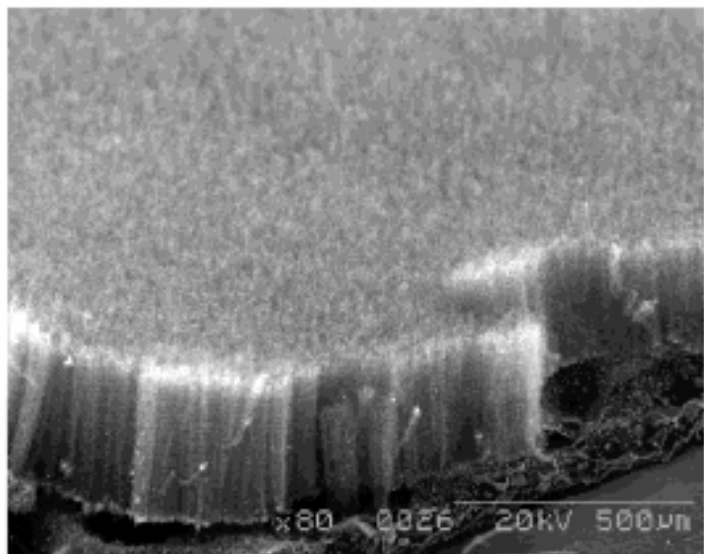


(c)

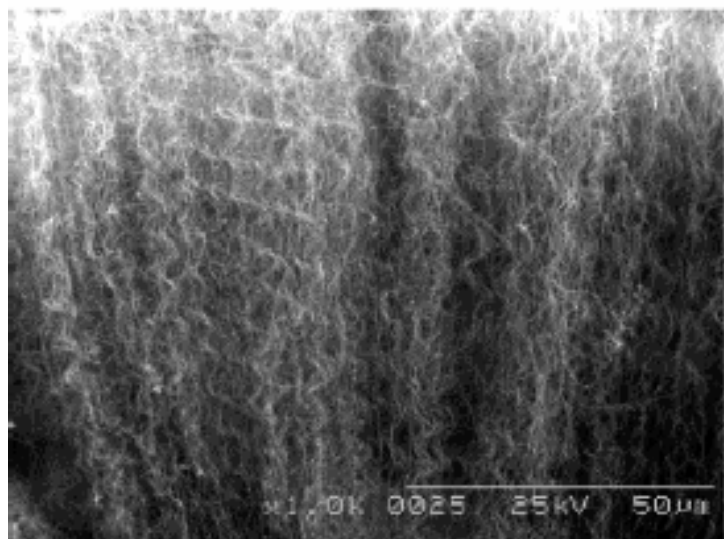
Growth of Helical Carbon Nanotubes



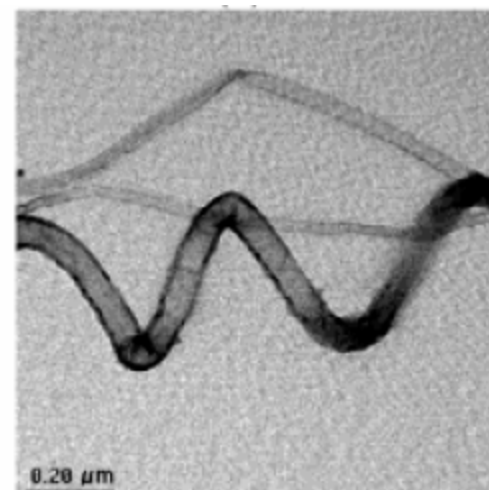
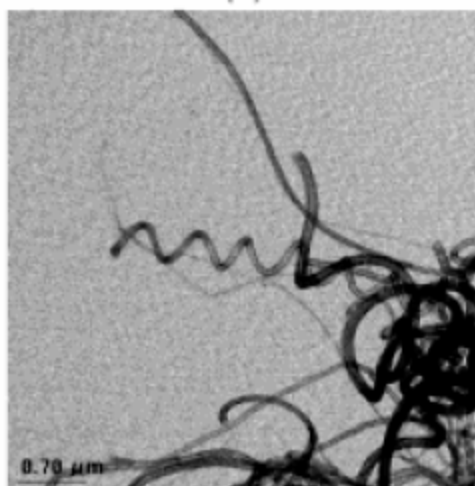
Aligned Helical Carbon Nanotubes



(a)

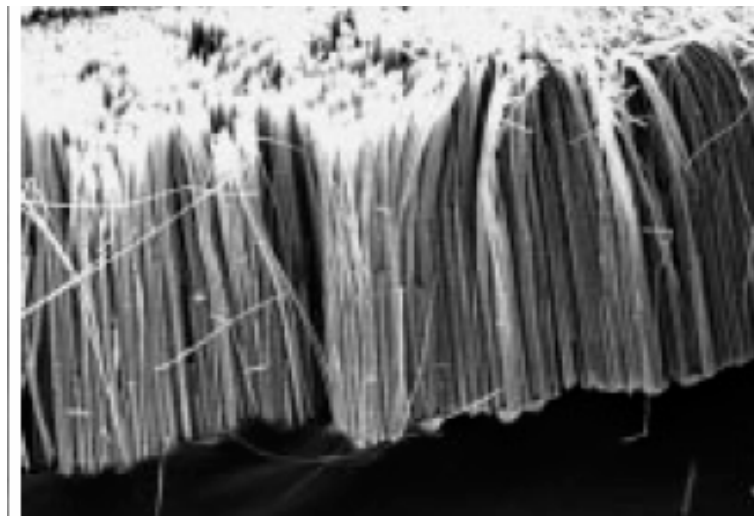
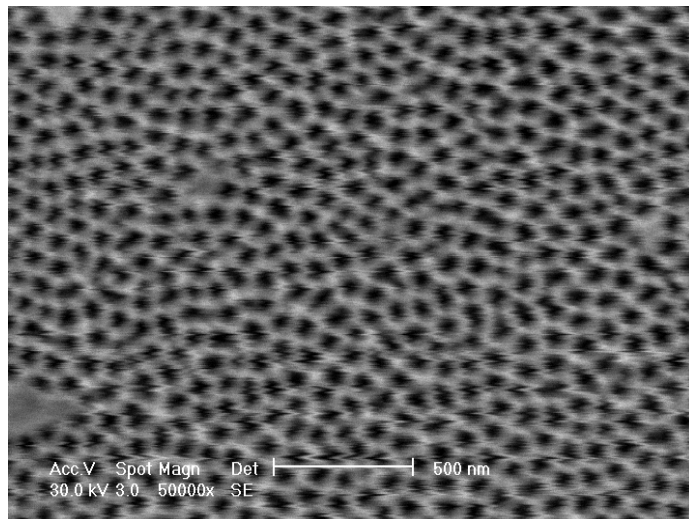
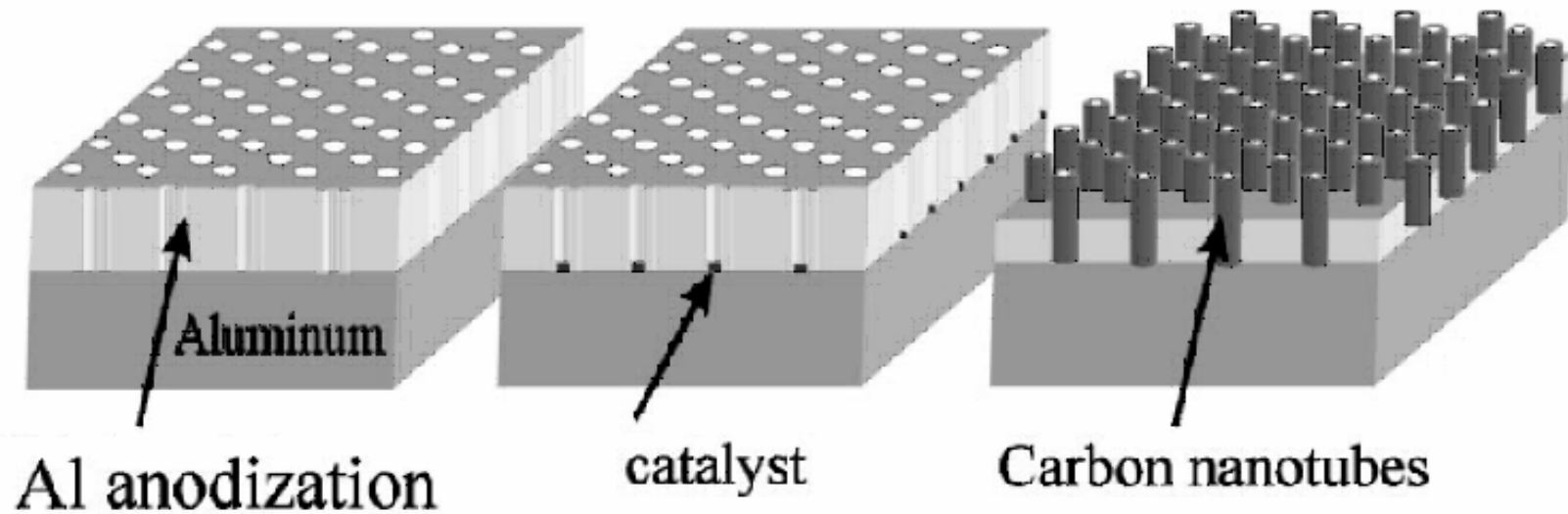


(b)



J. AM. CHEM. SOC. 2004, 126, 5070.

Template Synthesis of Carbon Nanotubes



Polymer and Carbon Nanotube Composites

(a) 1 wt% Surfactant-CNTs:

i) T_g increased

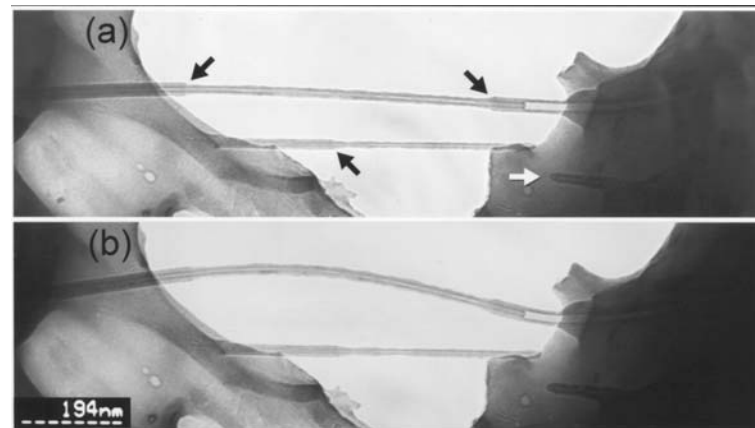
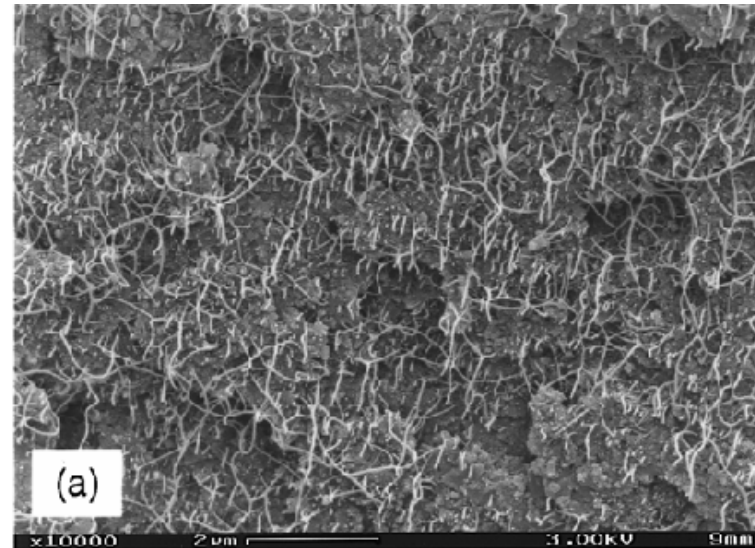
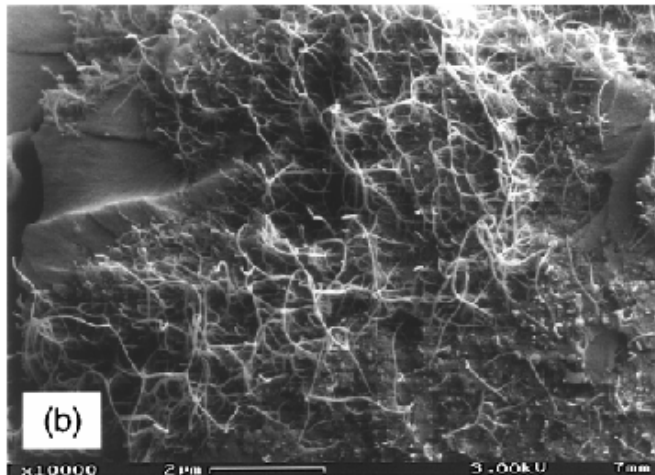
from 63 to 88 °C

ii) Elastic modulus

increased by > 30%

(b) Pure CNTs:

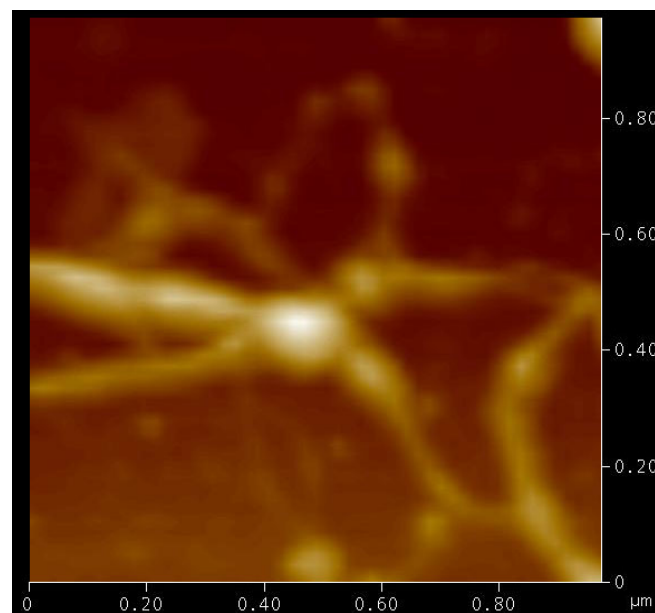
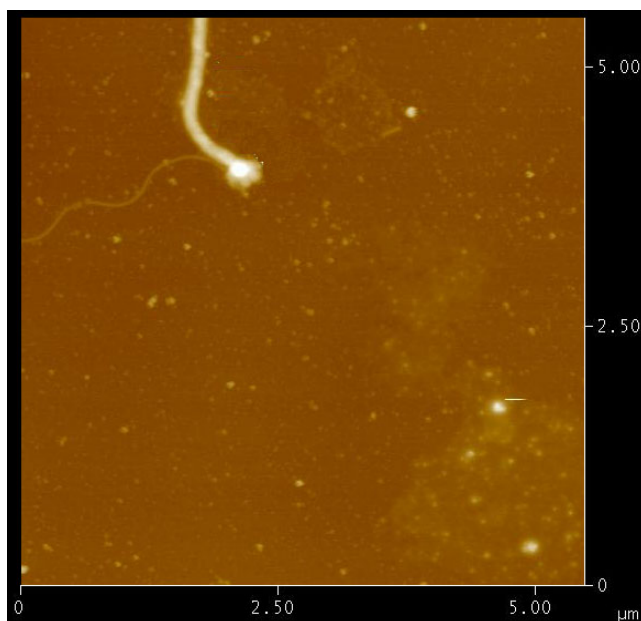
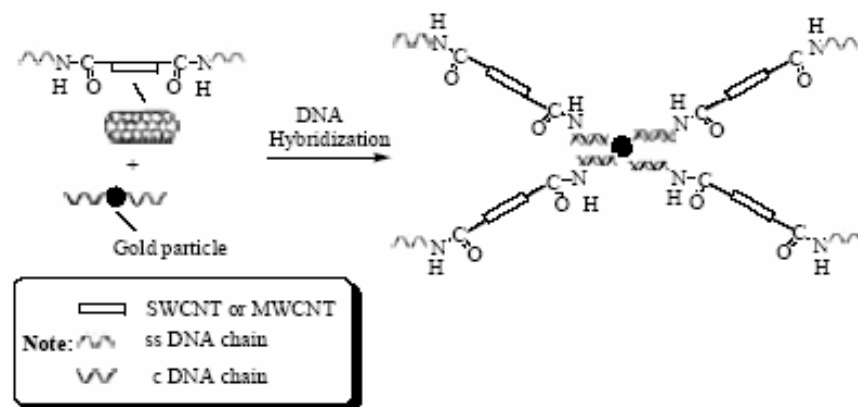
No obvious effect



Gong *et al.*, *Chem. Mater.* **2000**, 12, 1049.

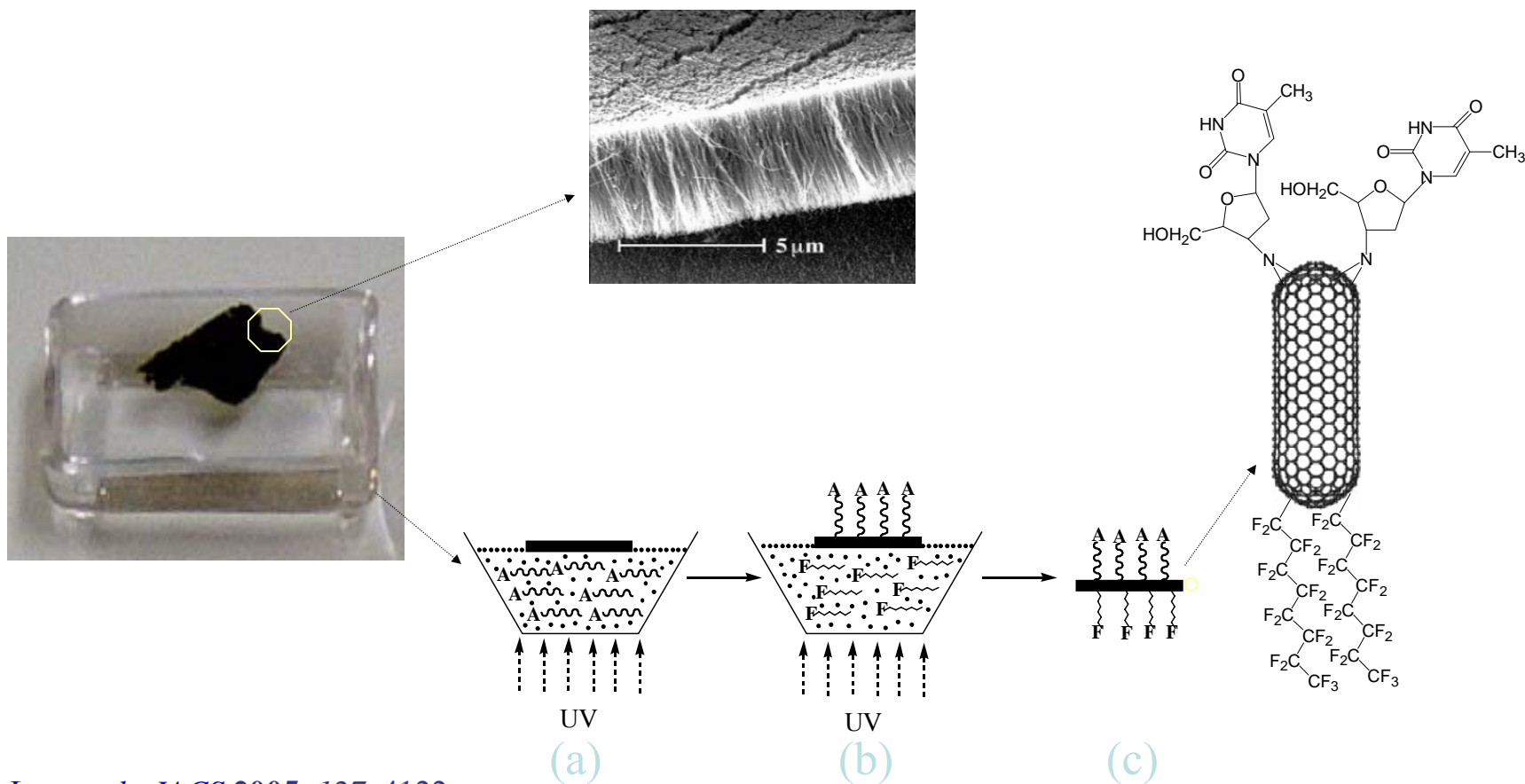
Hwang *et al.* *Nano. Lett.* 2001.

DNA-directed Self-assembly of Carbon Nanotubes



Li *et al.* JACS 2005, 127, 14.

Asymmetric End-Functionalization of Carbon Nanotubes



Lee *et al.* JACS 2005, 127, 4122.

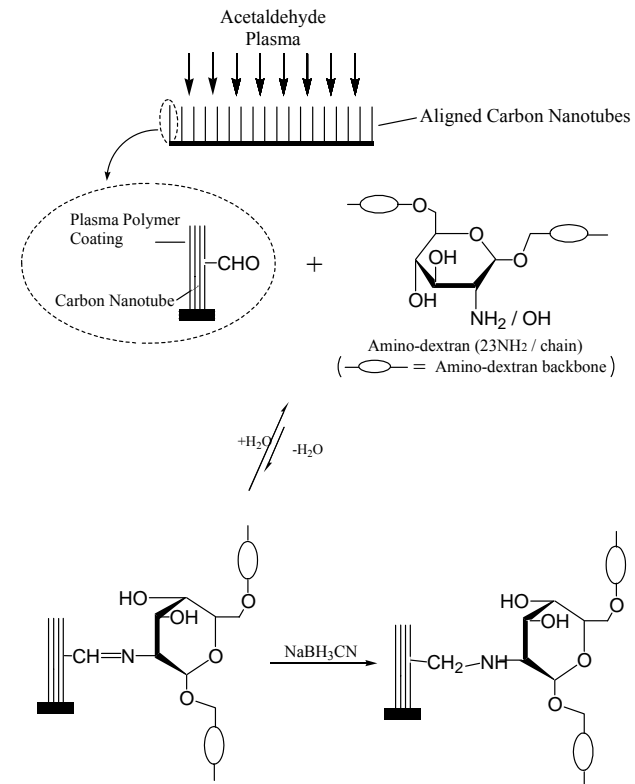
Plasma Activation of Aligned Carbon Nanotubes for Chemical Modification

Solution Chemistry: 1) Distortion of alignment; 2) Poor region-selectivity



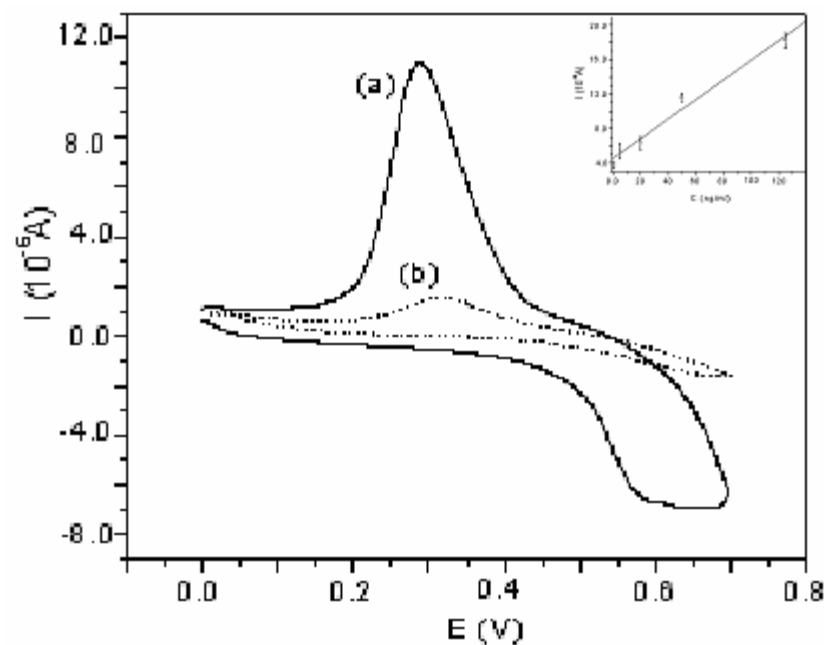
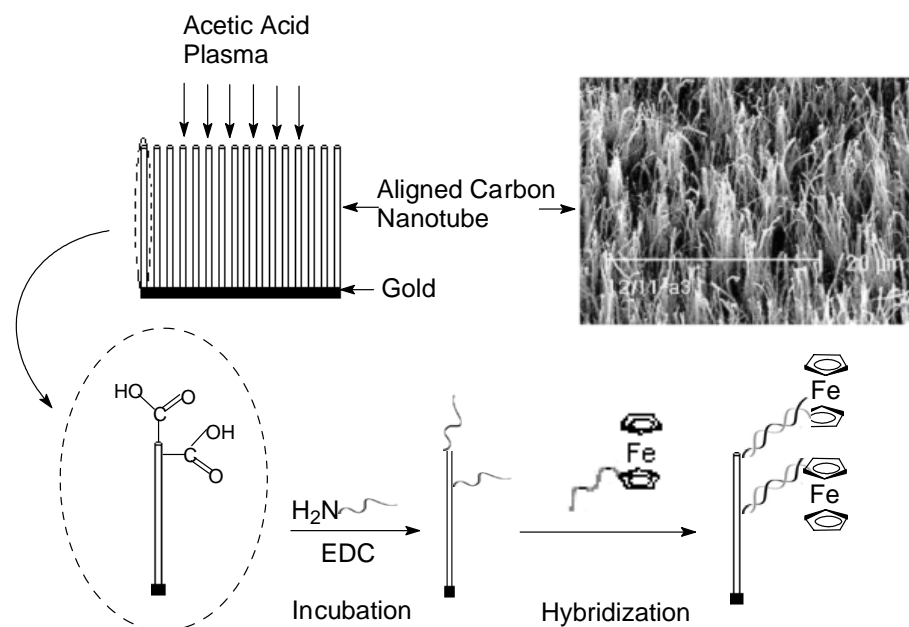
1) Plasma Polymerization:
e.g. heptylamine; -NH₂
acetaldehyde; -COH
acetic acid; -COOH
Methanol; -OH

2) Plasma Treatment
e.g. O₂ plasma etching
H₂O plasma etching



Chen, *et al. J. Phys. Chem. B* **2001**, 105, 618.

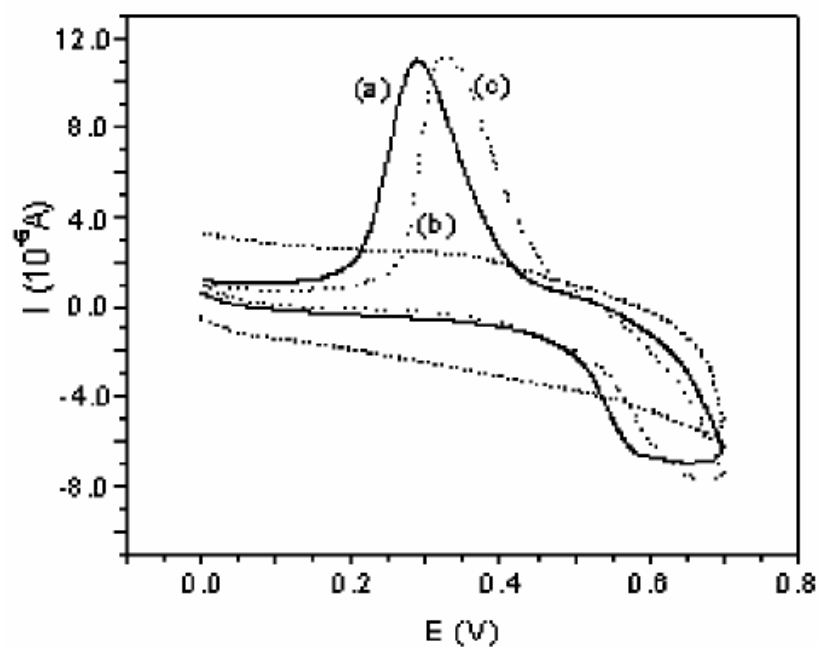
Aligned Carbon Nanotube-DNA Electrochemical Sensors



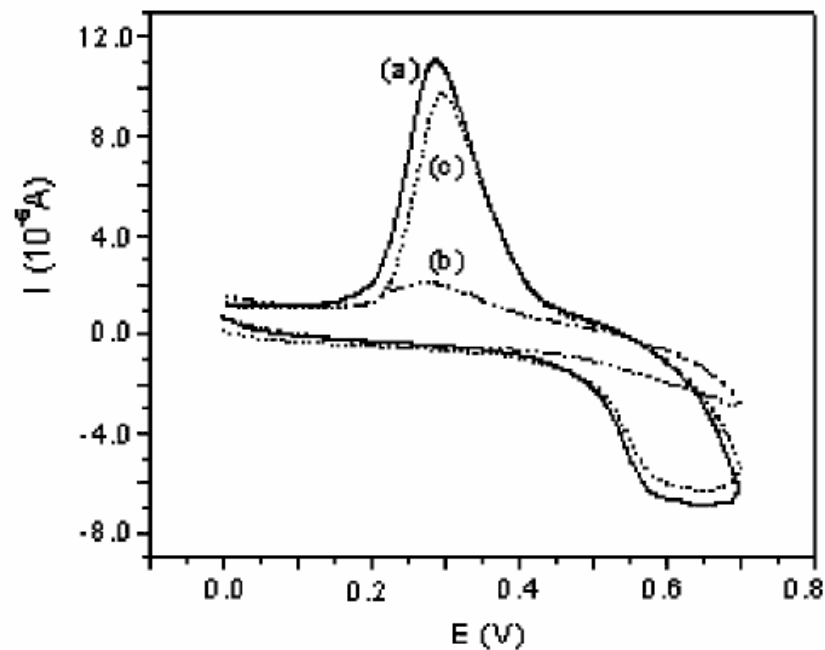
ss-DNA: [AmC6]TTGACACCAGACCAACTGGT-3'
c-DNA: [FCA-C6]ACCAGTTGGTCTGGTGTCAA-3'

He and Dai *Chem. Commun.* **2004**, 348.

Aligned Carbon Nanotube-DNA Electrochemical Sensors



(A)



(B)

CNT-ss-DNA: [AmC6]TTGACACCAGACCAACTGGT-3'

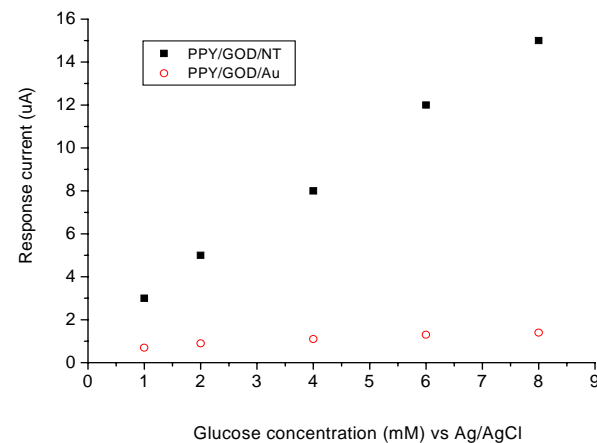
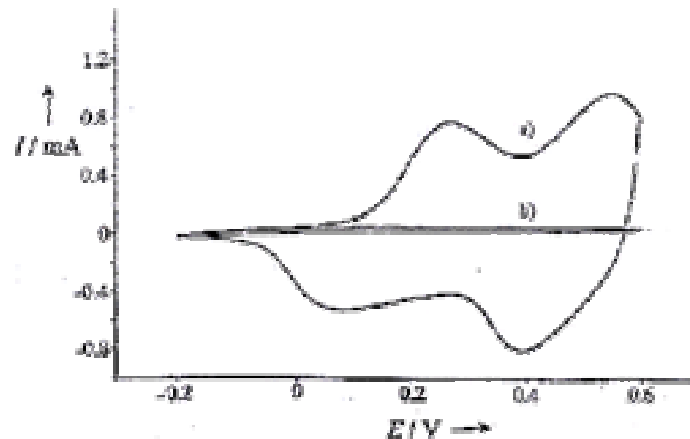
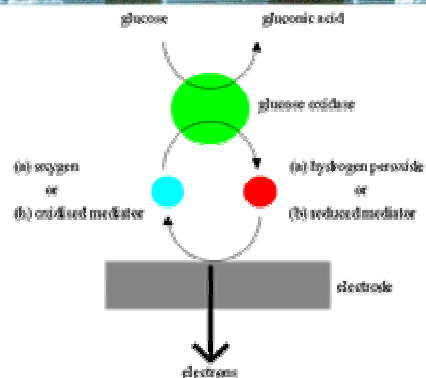
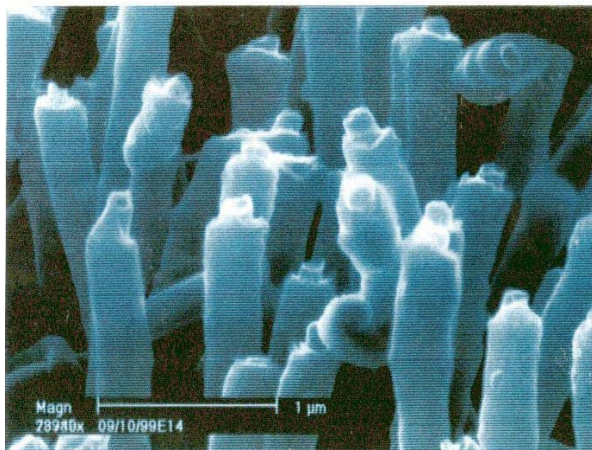
He and Dai *Chem. Commun.* **2004**, 348.

(a) c-DNA: [FCA-C6]ACCAGTTGGTCTGGTGTCAA-3'

(b) Non-c-DNA: [FCA-C6]CTCCAGGAGTCGTCGCCACC-3'

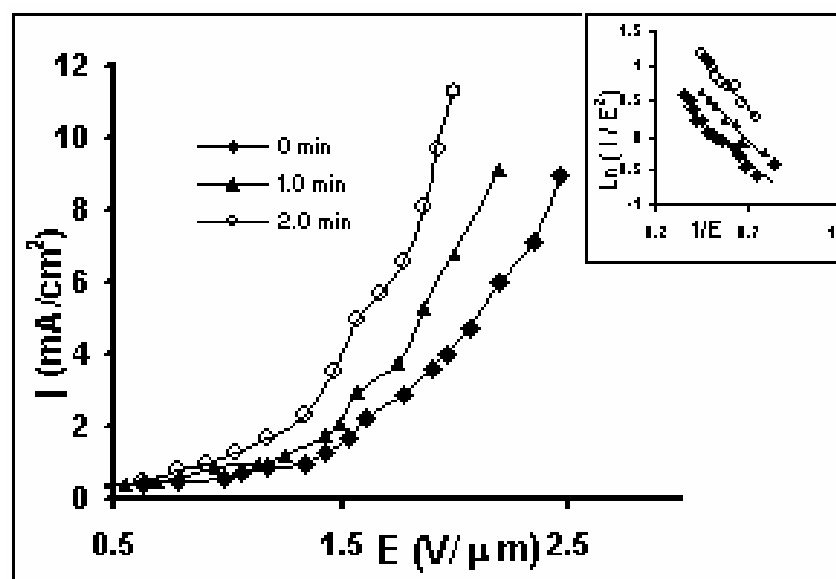
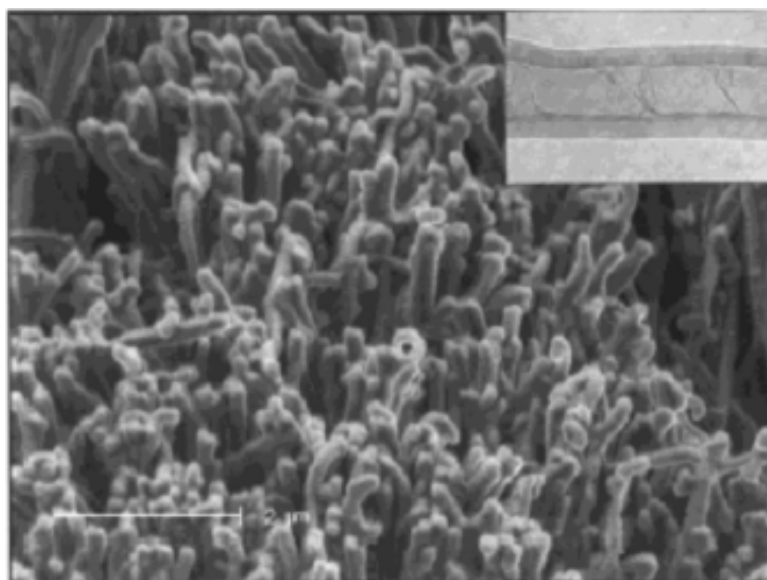
(c) Target DNA: 5'-GAGGTCCTCAGCAGCGGTGGACCAGTTGGTCTGGTGTCAA-3'

Carbon Nanotube-Conducting Polymer Coaxial Nanowire Glucose Sensors



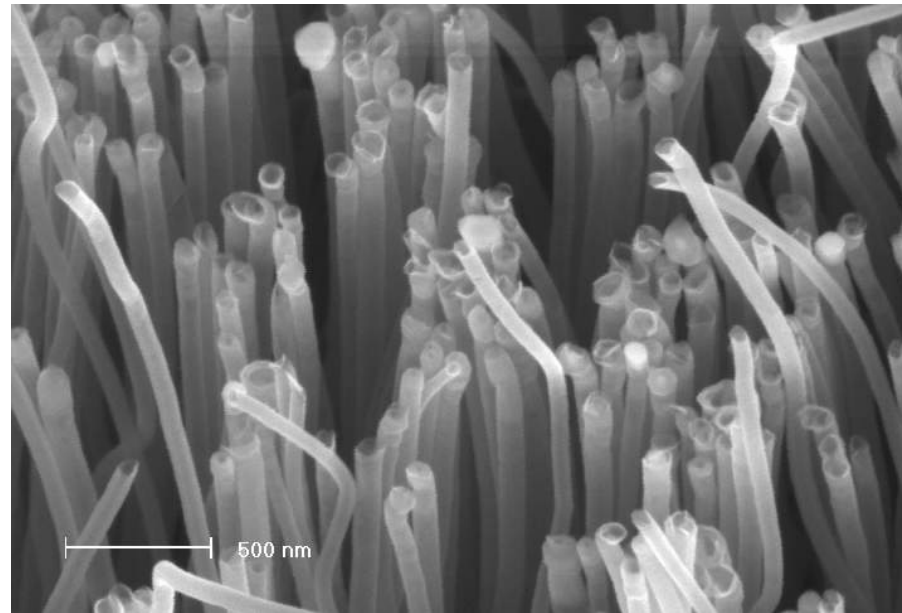
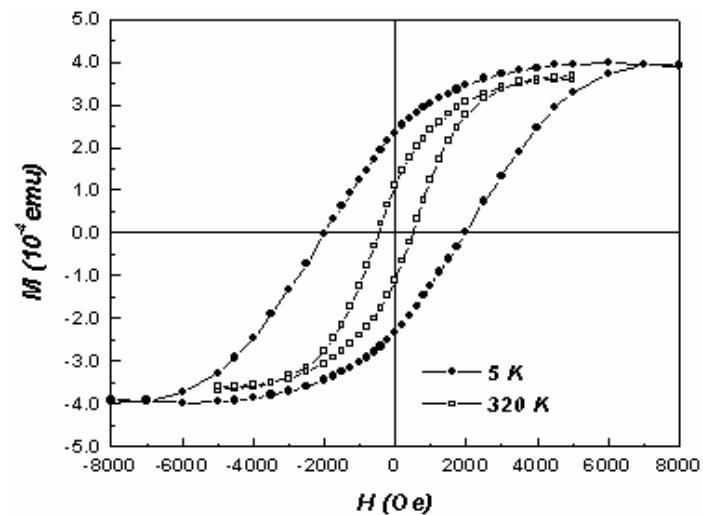
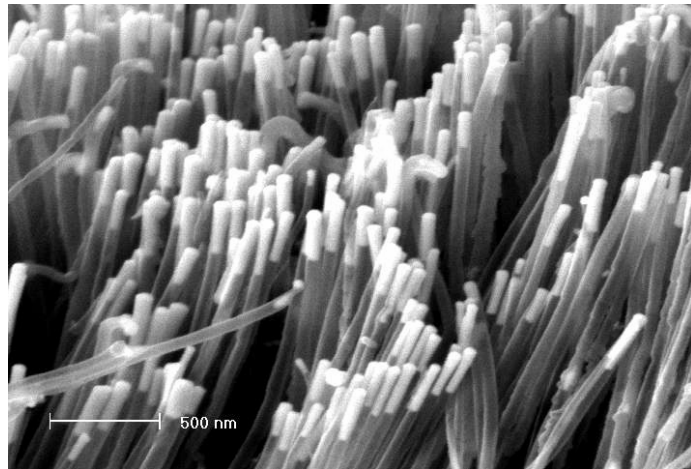
Gao, M. *et al.*, *Angew. Chem. Int. Ed.* **2000**, *39*, 3664.

Plasma Polymer-coated Aligned Carbon Nanotubes



Dai, *et al.*, *Nanotechnology* **2003**, *14*, 1081.

Plasma-etched Aligned Carbon Nanotubes

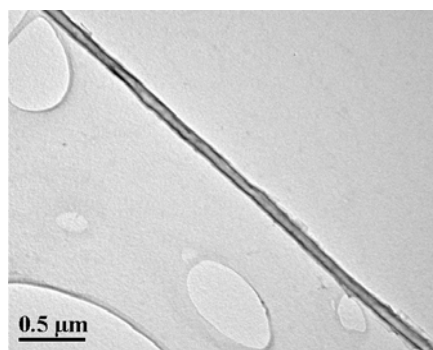


Zhang, et al., *J. Magnetism Magnetic Mater.* **2001**, 231, L9.

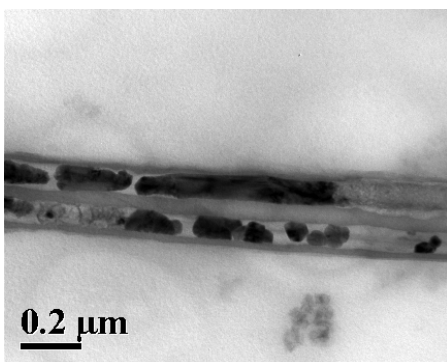
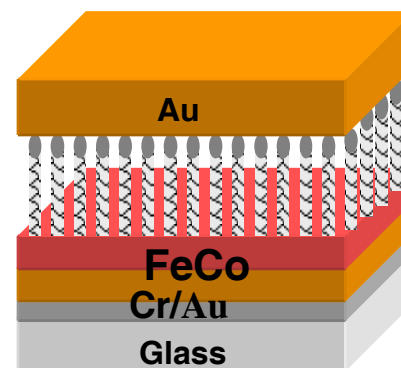
Metal/CP Filled Carbon Nanotubes



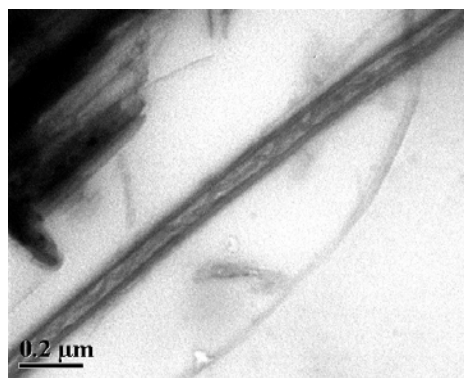
(a)



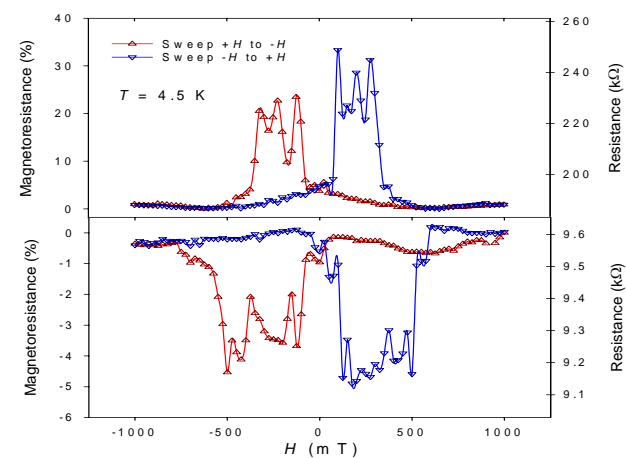
(b)



(c)

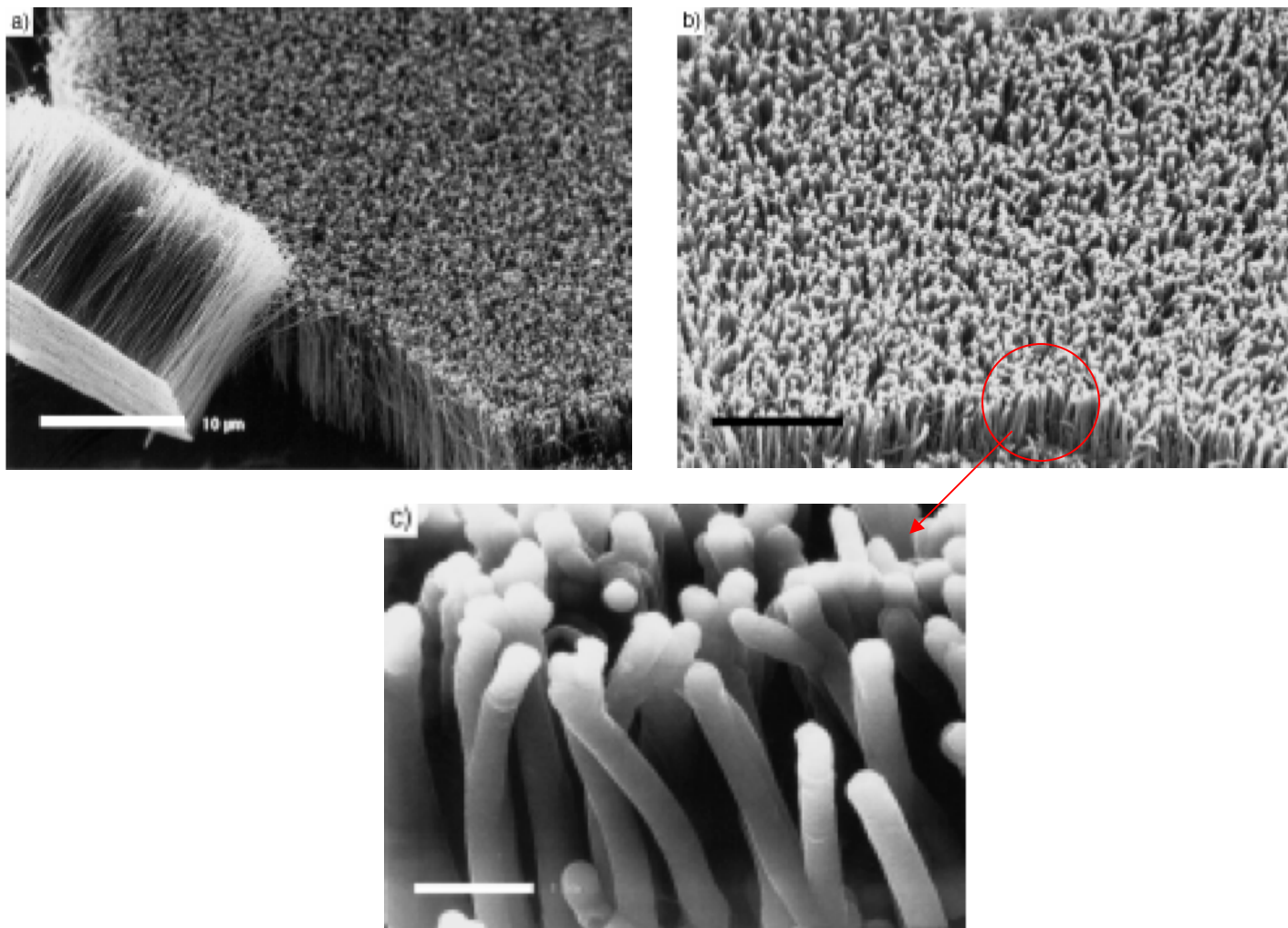


(d)



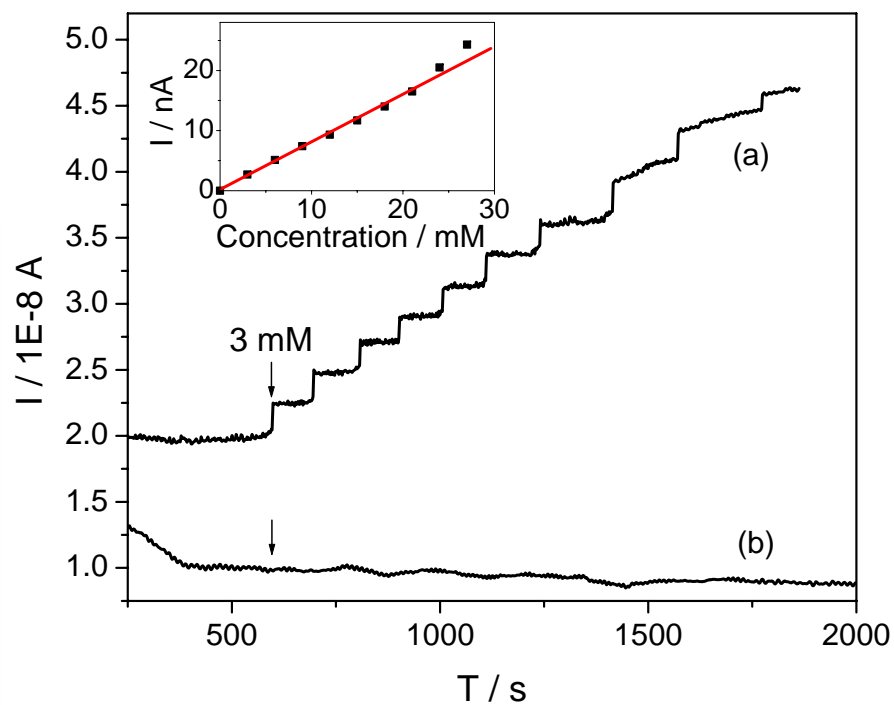
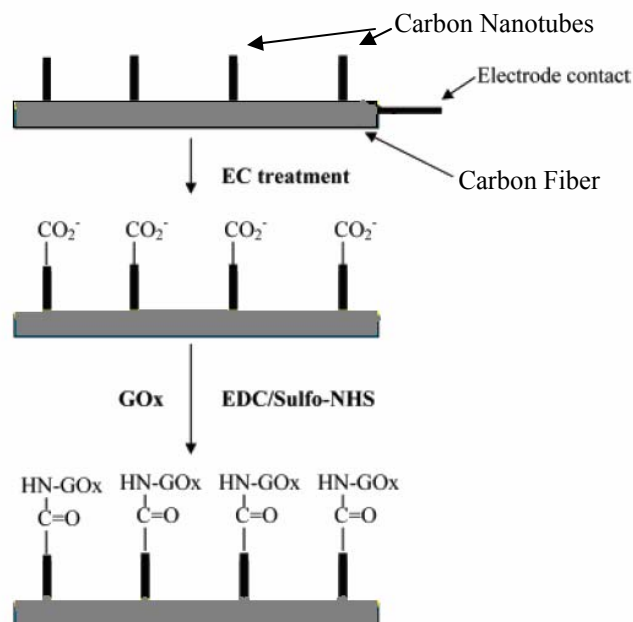
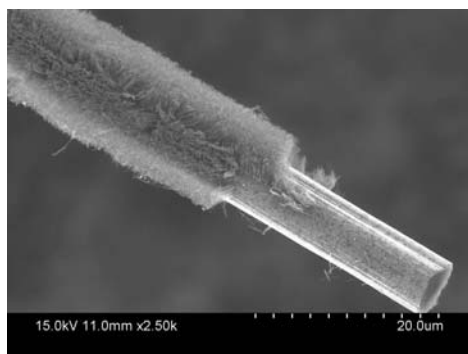
In collaboration with Arthur Epstein

Modification of Carbon Nanotubes with Conducting Polymers



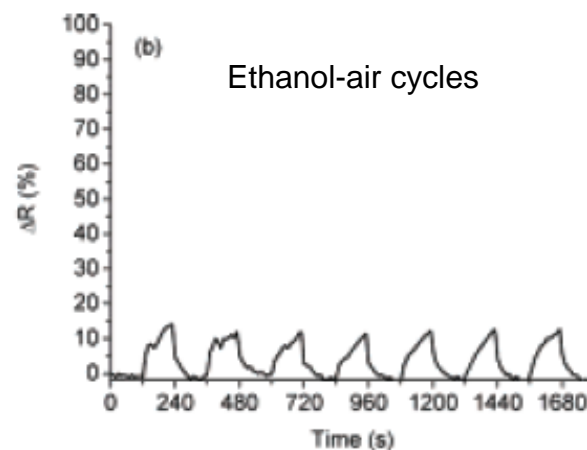
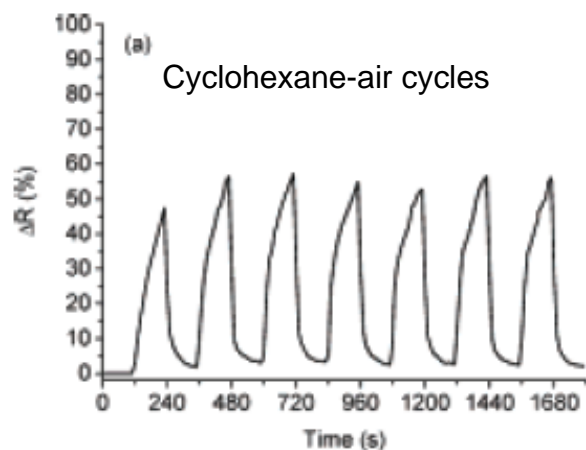
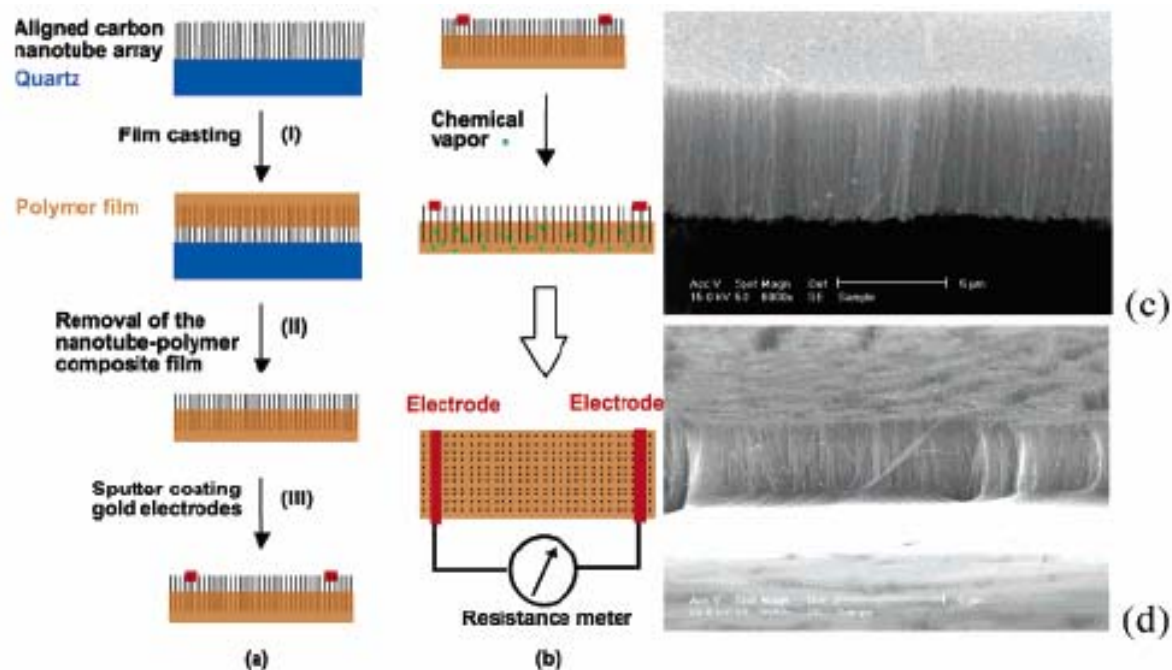
Angew. Chem. Int. Ed. **2000**, 39, 3664.

GOx attached Aligned CNT for Glucose Detection

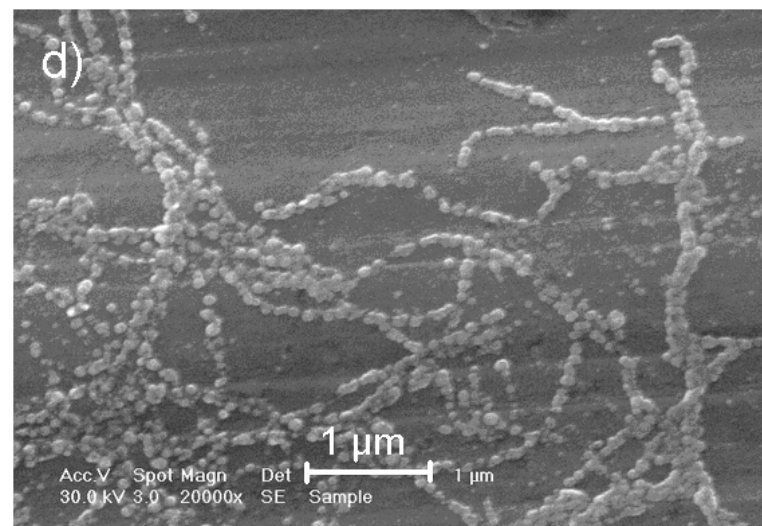
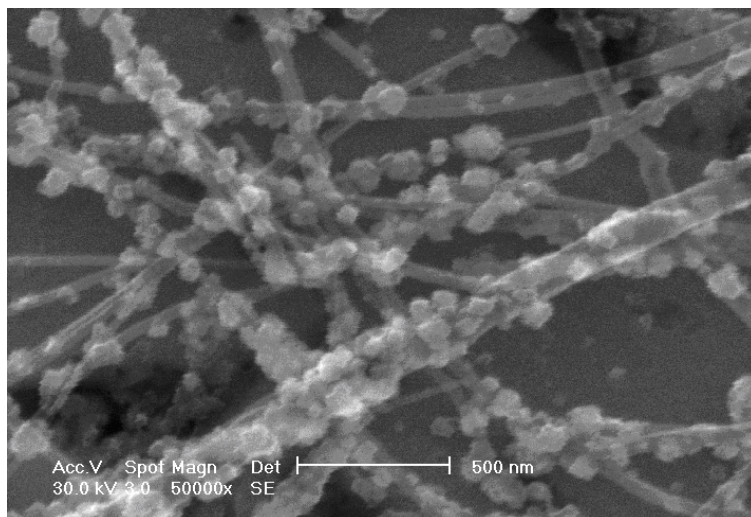
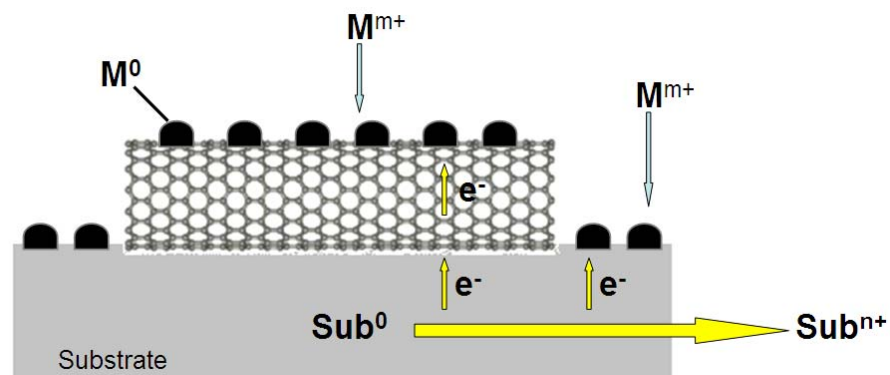


Small, 2006, Accepted

Chemical Vapor Sensors of Aligned Carbon Nanotube transferred to polymer film



Metal Nanoparticle-Coated Carbon Nanotubes by SEED



Au, Ag, Pt, Pd, Cu, etc.

J. AM. CHEM. SOC. 2005, 127, 10806-10807

Electroless deposition (Galvanic displacement reaction)

$$R(\text{Au}^{3+}/\text{Au}) = +1.002 \text{ V}$$

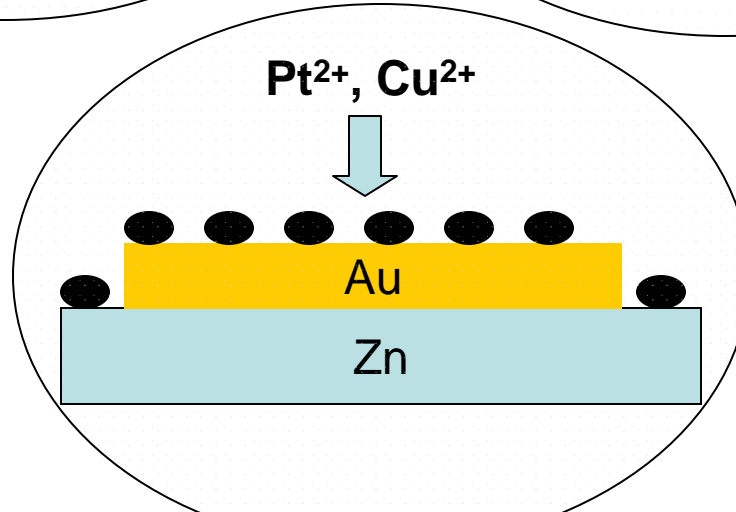
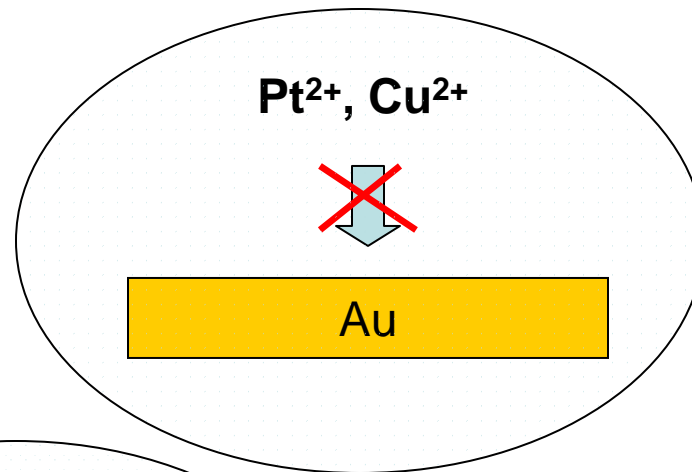
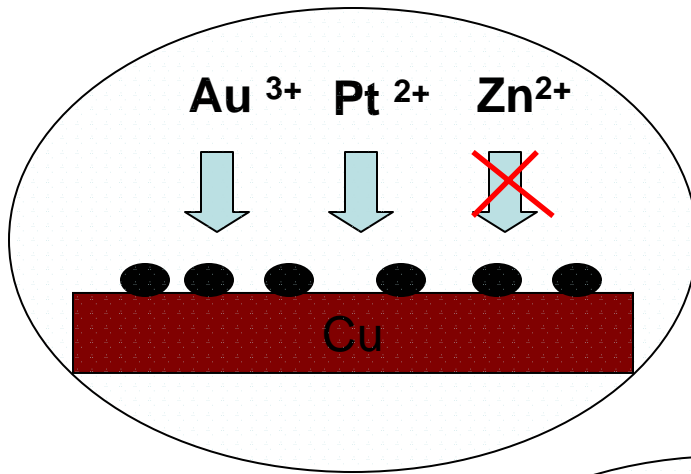
$$R(\text{Pt}^{2+}/\text{Pt}) = +0.775 \text{ V}$$

$$R(\text{Cu}^{2+}/\text{Cu}) = +0.34 \text{ V}$$

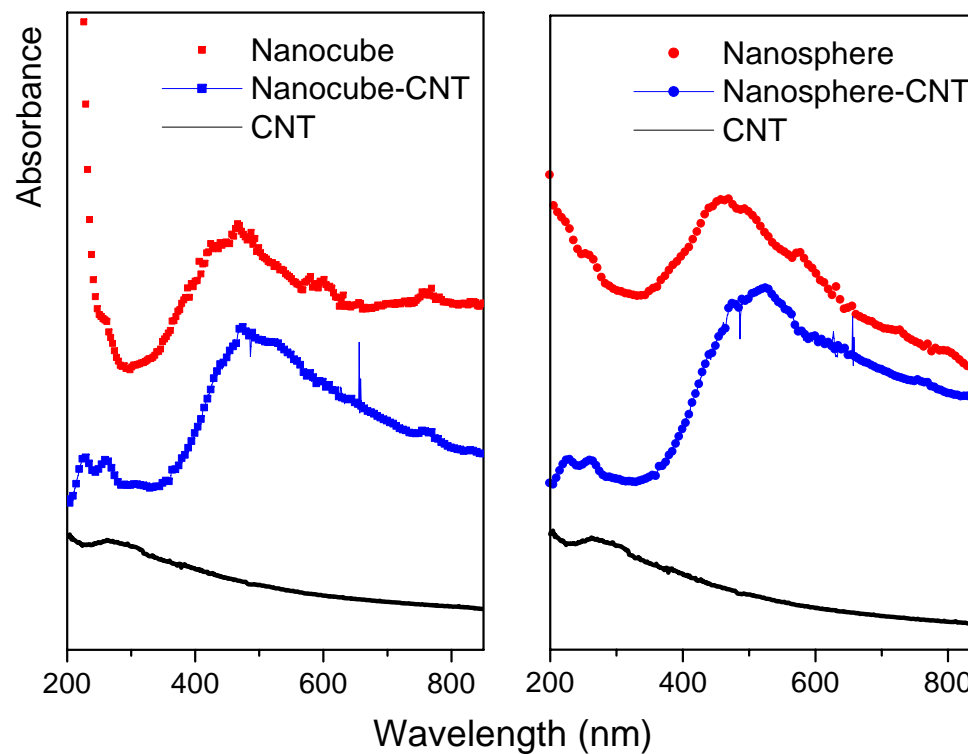
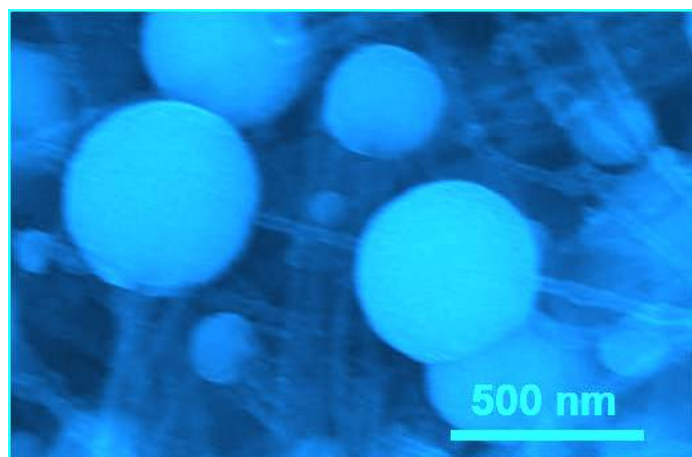
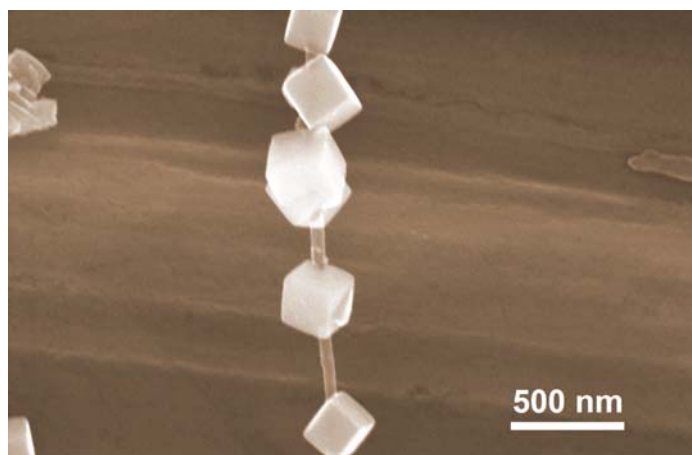
$$R(\text{Zn}^{2+}/\text{Zn}) = -0.76 \text{ V}$$



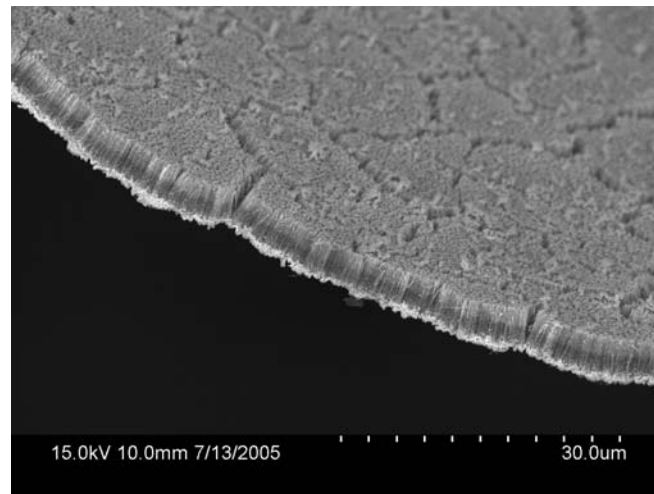
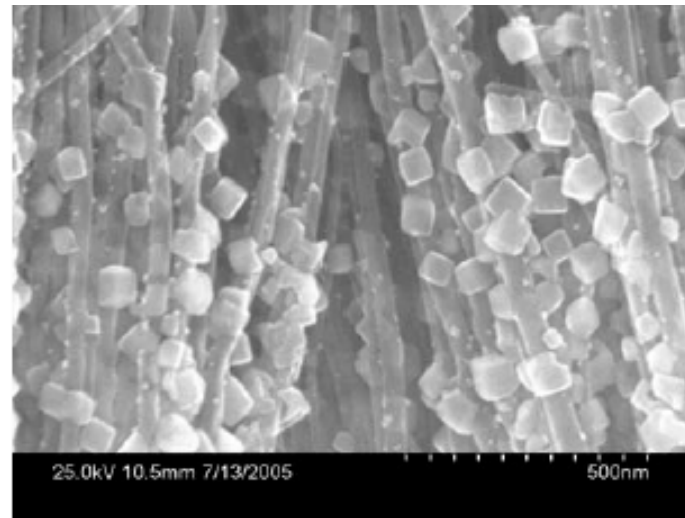
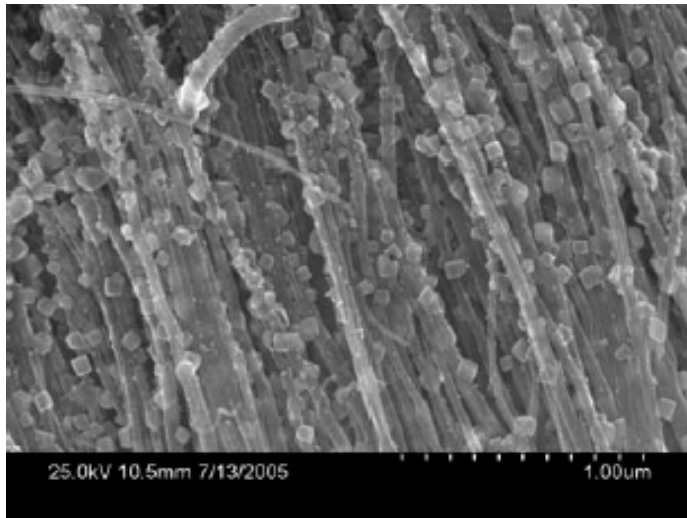
R: Redox potential



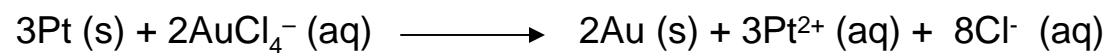
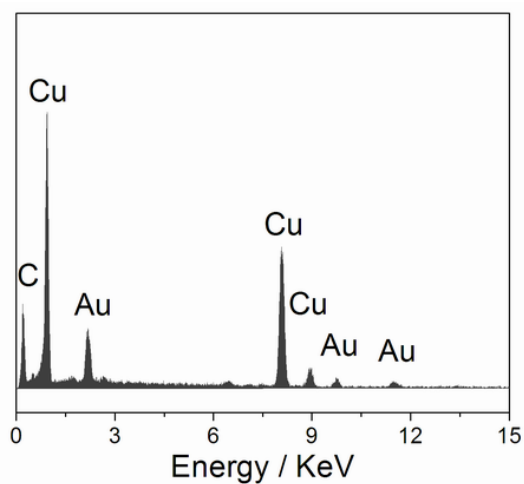
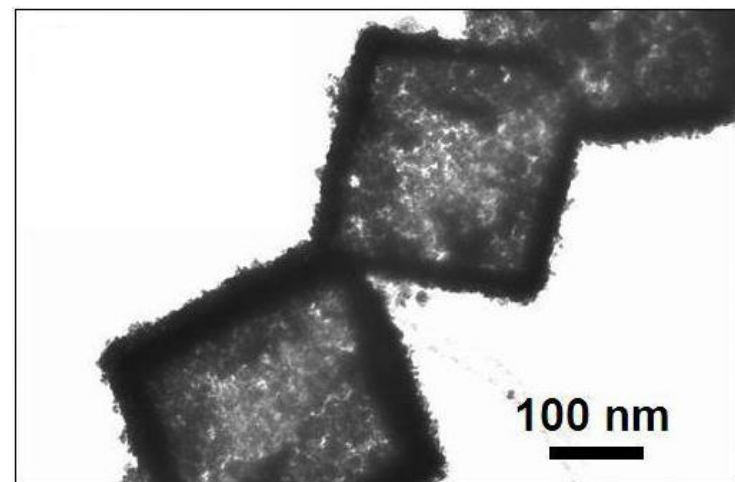
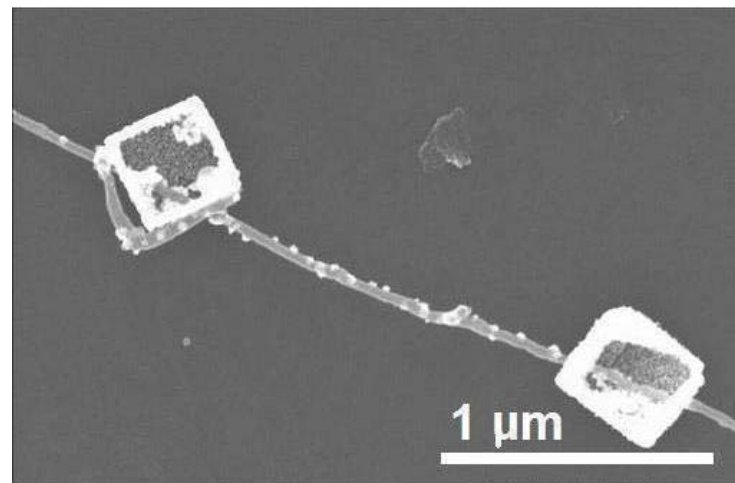
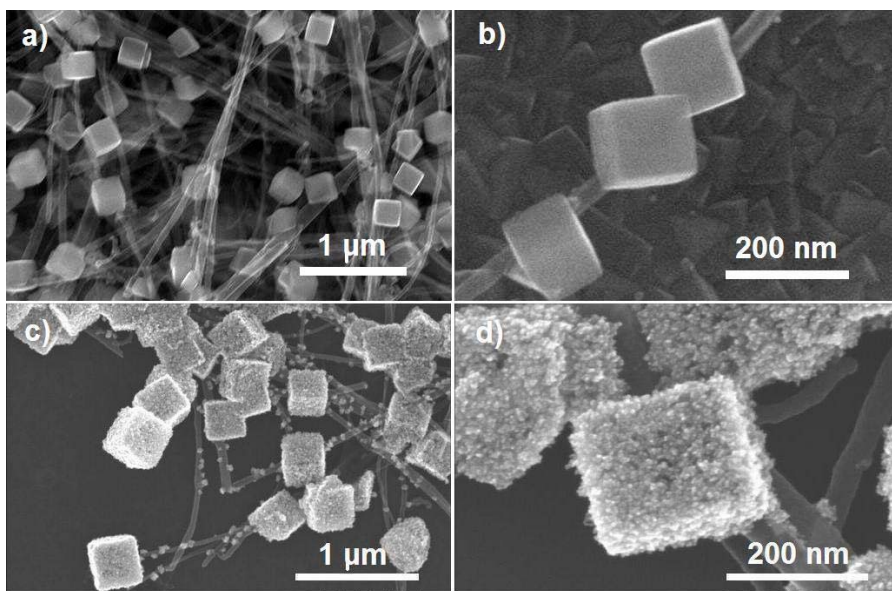
Outerwall Modification of Carbon Nanotubes with Shape controlled Nanoparticles



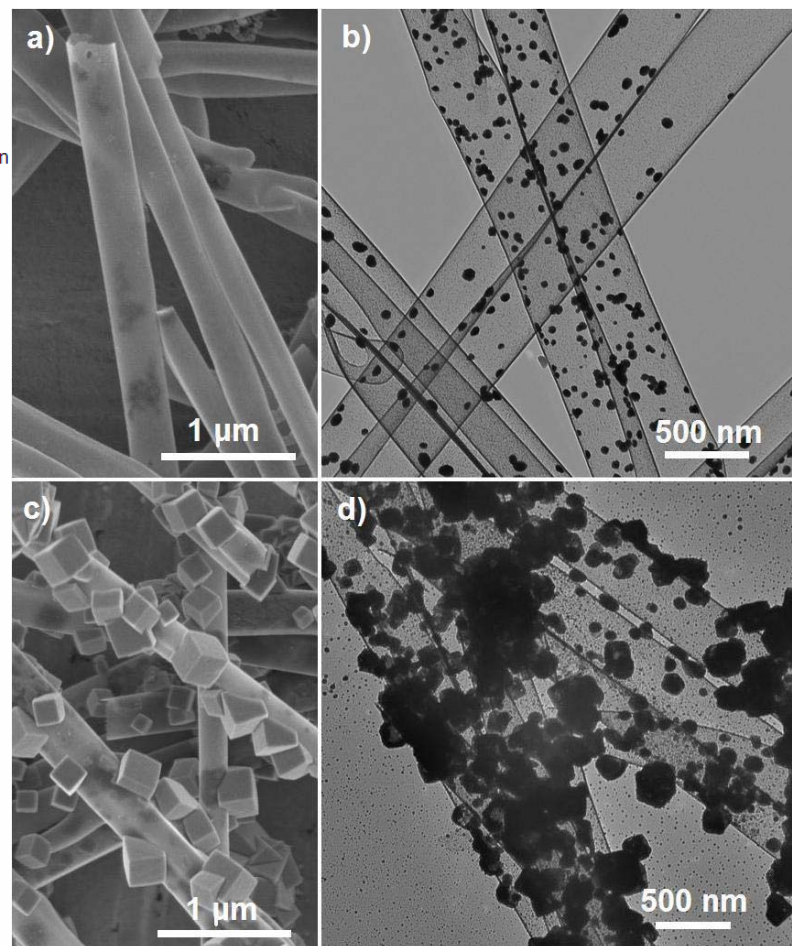
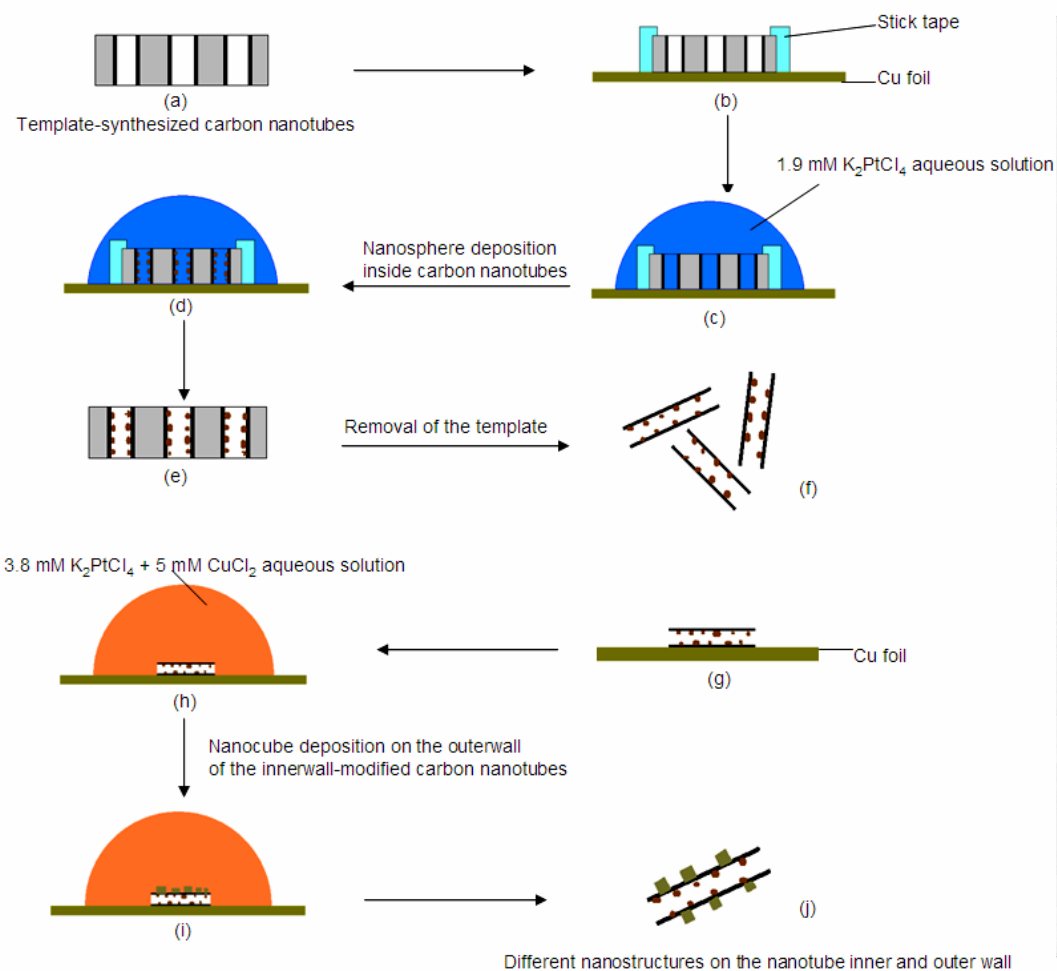
Metal Nanoparticle-Modified Aligned Carbon Nanotubes



Gold Nanobox Modified Carbon Nanotubes

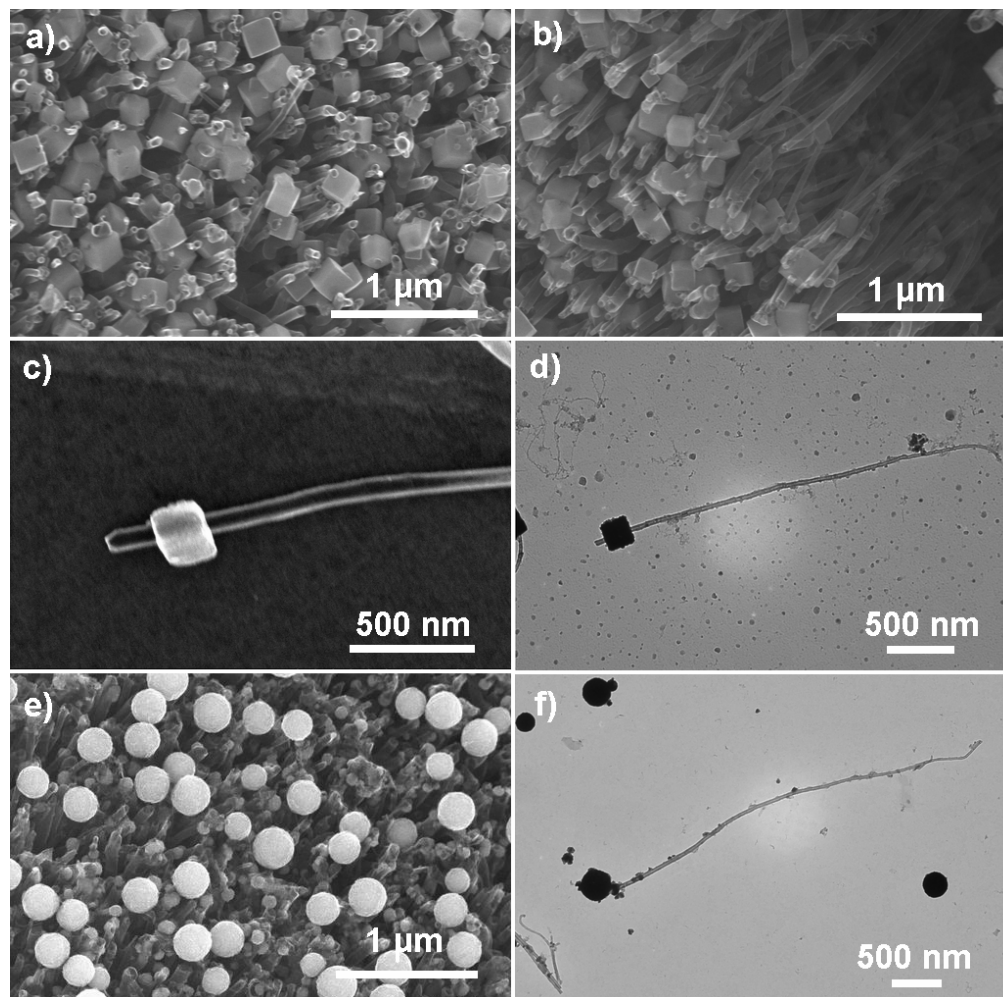


Innerwall and Outerwall Asymmetric Modification of Carbon Nanotubes



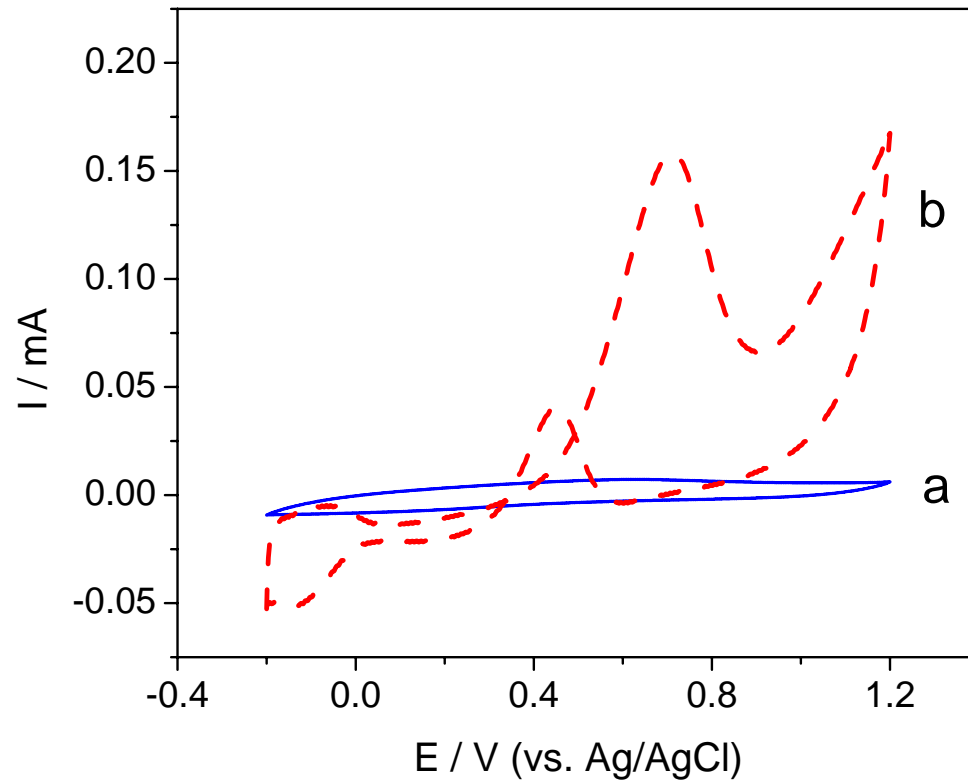
J. AM. CHEM. SOC. 2006, 128, 5523-5532

Selective Tip Modification of Carbon Nanotubes



J. AM. CHEM. SOC. 2006, 128, 5523-5532

Potential Application for Fuel Cell



(a) pristine aligned CNT

(b) Pt nanoparticles modified aligned CNT

in a N_2 -saturated aqueous solution of 2 M CH_3OH + 0.1 M H_2SO_4 solution

Liming Dai may come later today. If you are still here, we can arrange his talk tomorrow Saturday, somehow.

Please let me know if you are interested!