Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Licensing Opportunity

CMOS Compatible Carbon Nanotube Growth

Integration of nanostructures into microchips by "self-assembly"

Invention

A novel method for the growth of nanostructures at room temperature utilizing a localized chemical vapor deposition (CVD) method.

Microscale resistive heaters replace standard global reaction furnace heating in a process that maintains the integrity of an existing CMOS chip, while integrating self-assembled nanotubes.

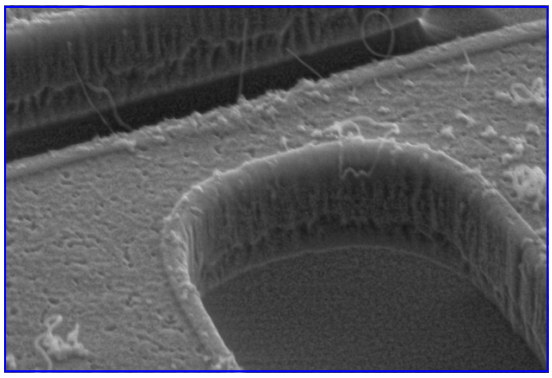

Fig.1. SEM of microheater containing locally synthesized carbon nanotubes. Growth of small (< 20 nm) diameter nanotubes occurred in the vicinity of the maximum temperature. Bundles of single walled or thick multi walled CNTs were observed in colder regions away from the maximum heat spot. [1]

[1] A. Jungen *et al.* "Localized and CMOS compatible growth of carbon nanotubes on a 3 x 3 μm^2 micro heater spot" TRANSDUCERS '05 Vol. 1, June 5-9, 2005, pp. 93 - 96

Competitive Advantages

- Room temperature processing, compatible with CMOS technology
- Rapid growth
- Fast thermal response (0.01 ms) allowing for extremely steep heating ramps compared to classic CVD, and dramatic reduction in thermal budget

Production Efficiency and Savings:

- Micro-heaters reduce production time and cost compared with standard furnace heating
- Power provided per single system approximately: 200mW vs. classic CVD at 1000 W)
- Self assembly negates the need to purchase pre-synthesized CNTs

Applications

- Nano-sensors
- Automotive/Force Sensors
- Gas Sensors
- Field Emitters
- Nano-electronic-mechanical devices

Keywords

Nano-electronic-mechanical devices (NEMS)
Carbon Nanotubes (CNT)
Single-wall carbon nanotube

Patent Status

Patent pending

Contact

ETH Zurich
ETH transfer, HG E 48.2
Raemistrasse 101, CH - 8092 Zurich
Phone: +41 44 632 23 82
Fax: +41 44 632 11 84
transfer@sl.ethz.ch
http://www.transfer.ethz.ch

Ref. No. T-05-005