Background

The global demand for carbon nanotubes is expected to reach $807.3 million by 2011 (Source). One difficulty with carbon nanotube growth is the placement and alignment of individual nanotubes. This new technique utilizes Laser-assisted Chemical Vapor Deposition (LCVD) at relatively low substrate temperatures to align the growth of single-walled carbon nanotubes (SWNT). The key to this current method is the utilization of a laser beam to heat two electrode tip apexes thus creating proper conditions to grow a SWNT connecting the electrodes.

Competitive Advantages

- SWNTs are electronically connected at each end
- SWNTs can be grown at relatively low substrate temperatures
- Ability to align the growth of individual SWNTs

Applications

- Microelectronic transistor gates
- Resonator structures
- Microelectronic circuit connections
- Sensor devices
- Field-emission devices
- Nano-electro-mechanical systems

For more information about: Technology ID # 1076-1126
US Patent Pending

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**Technique to Align Single Carbon Nanotube Growth**

**A Technical Perspective**

**Technical Specifications**

- **Ids–Vds curves of the individual single-walled carbon nanotube**

  - Aligns growth of individual single-walled carbon nanotubes

- **Schematic of the LCVD experimental setup**

  - LCVD nanotube growth takes place at a relatively low substrate temperatures

**Publication**

Xiong W; Zhou Y S; Mahjouri-Samani M; Yang W Q; Yi K J; He X N; Liou S H; Lu Y F  
**Self-aligned growth of single-walled carbon nanotubes using optical near-field effects.** Nanotechnology (2009), 20(2), 25601.

**Inventor**

Dr. Yongfeng Lu led the research team that developed this technique to align the growth of carbon nanotubes. Dr. Lu has research background in the areas of laser-based microscale and nanoscale material processing. Dr. Lu has over 150 peer-reviewed journal publications and over 160 presentations in international conferences. He led the group that pioneered laser removal of nanoparticles from solid surfaces (commonly known as laser cleaning) and nanoscale patterning by optical resonance in microparticles.

Inventor homepage: [http://engineering.unl.edu/academicunits/ElectricalEngineering/faculty-staff/lu.shtml](http://engineering.unl.edu/academicunits/ElectricalEngineering/faculty-staff/lu.shtml)

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