Docket #: S08-247

Field-Effect Transistor (CNFET), transparent electrodes and three-dimensional integration of CNFETs

Stanford researchers have developed a novel method for wafer-scale production of aligned and ultra-high density carbon nanotubes (CNTs) and nanotube grid. The CNTs produced with this controlled, multiple-transfer technology could be used for making very high performance CNT Field-Effect Transistors (CNFET). The process also allows for three-dimensional integration of the CNFET in a circuit. In addition, the technique can be used to manufacture low cost, highly transparent and low-resistivity electrodes for flexible electronics and flat panel displays.

Applications

- **CNFETs** for 3-D integrated circuits
- **Transparent electrodes** for:
    - flexible electronics
    - flat panel display

Advantages

- **Wafer-scale production** which reduces the time and cost of manufacturing
- **Ultra-high-density CNTs** - because the process allows for more than two transfers of CNTs from source substrate

Publications

- U.S. Published Patent Application 20110133284, "MULTIPLE CARBON NANOTUBE TRANSFER AND ITS APPLICATIONS FOR MAKING HIGH-PERFORMANCE CARBON NANOTUBE FIELD-EFFECT TRANSISTOR (CNFET), TRANSPARENT ELECTRODES, AND THREE-DIMENSIONAL INTEGRATION OF CNFETS".
- Hai Wei, N. Patil, A. Lin, H.-S. Philip Wong, S. Mitra. "Monolithic Three-Dimensional Integrated Circuits using Carbon Nanotube FETs and Interconnects", *IEEE IEDM 2009 Proceedings*. December 6, 2009.

Patents

- Published Application: 20110133284
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