

Abstract Submitted
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Growth Characteristics of Long, Gas Flow Aligned Carbon Nanotubes (CNT) by Chemical Vapor Deposition (CVD)¹ ALFONSO REINA, MARIO HOFMANN, DAVID ZHU, JING KONG, MIT — An investigation is undertaken to elucidate differences in the growth of long, gas flow aligned nanotubes and short, randomly oriented nanotubes. The synthesis is carried under ambient pressure ethanol and methane CVD from iron-based nanoparticles on SiO₂ substrates. The two CNT morphologies are controlled by tuning chemical parameters such as catalyst pre-treatment. The growth of long, aligned CNTs presents two main differences over the growth of short, randomly aligned CNTs. The growth lifetime is significantly higher (15 minutes vs. 10 seconds) and alignment with the gas flow occurs only when a nanotube achieves a length of 40 μm , suggesting that short growth lifetimes limit not only the length of CNTs but also their alignment with the gas flow. Finally, a series of studies were done to explore possible mechanisms of CNT growth death. Differences in the nanoparticles catalytic lifetime and/or CNT growth rate are the most probable factors determining alignment.

¹MARCO Interconnect Focus Center

Alfonso Reina
MIT

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