

Abstract Submitted
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Directional growth of Single-Walled Carbon Nanotubes for Nanotube-on-Insulator Applications SONG HAN, XIAOLEI LIU, CHONGWU ZHOU — Dense arrays of highly aligned carbon nanotubes were synthesized by chemical vapor deposition on flat crystalline substrate surfaces. The nanotube orientation was found to favor certain crystalline directions of the substrate, regardless of the gas flow direction. This is in sharp contrast to the randomly oriented growth of nanotubes on Si/SiO₂ substrates. These nanotubes are commonly tens of micrometers long, and the intertube spacing is typically around 200 nm, which can be controlled to certain degree. In addition, a second layer of nanotubes can be grown along the gas flow direction atop the first layer by carrying out a second round of CVD synthesis. This observation, as a side proof, supports the hypothesis that the substrate-nanotube interaction plays an important role. Our synthesis of dense arrays of well aligned and evenly spaced carbon nanotubes paves the way toward large-scale assembling of nanotube-on-insulator (NOI) devices and circuits, in analogy to the silicon-on-insulator (SOI) approach adopted by the semiconductor industry.

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