

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**New opportunities from controlled growth of carbon nanotubes.**  
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Columbia University — Aligned growth of carbon nanotubes (CNT) has been an important issue to researchers involved in CNT, and recent work has proved the possibility of alignment by using special substrates (i.e. quartz, sapphire, etc.) where CNT can grow along crystallographic axes. We present here two applications of aligned tubes produced from quartz substrates. The first is the realization of an integrated platform for using CNTs as electrodes for single molecules toward sensing applications; numerous sensing units can be generated by photolithography without long, tedious e-beam writing steps due to the precise control of location and direction of CNTs over a large area ( $\sim 1 \times 1$  cm). The second is measurement of the high frequency properties of CNTs, which is difficult due to the high impedance of single-tube devices. By a slight modification of growth parameters, we have achieved growth of 'serpentine' CNTs on quartz substrates that permit the fabrication of low-impedance devices using multiple identical CNT sections.

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Date submitted: 27 Nov 2007

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