

Abstract Submitted
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Temperature-Induced Density Control of CVD Grown Horizontally Aligned Single-Walled Carbon Nanotubes JUN WEI LAM, Cornell University, BRYCE KOBRIN, University of California, Berkeley, ALEJANDRO CORTESE, Cornell University, JOSHUA ALDEN, Georgia Institute of Technology, JONATHAN ALDEN, PAUL MCEUEN, Cornell University — We report an exponential dependence of the density of CVD-grown horizontally aligned single-walled carbon nanotube (SWNT) on the growth temperature. The SWNT arrays, which are grown on ST-cut quartz with Fe catalysts patterned 100 nm apart, have a density of $1/\mu\text{m}$ at 8850 C and demonstrate a density drop of one decade per 280C thereafter. This enables a way to make parallelizable arrays of individual SWNT devices. In line with previous studies, We also find the SWNT diameter to increase with temperature, from 0.8 nm at 8500C to 1.8 nm at 9200C. Furthermore, we demonstrate that the SWNT diameter is correlated with the catalyst particle size, which increases with temperature.

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