Abstract Submitted for the MAR06 Meeting of The American Physical Society

Controlling the height of CVD-grown multi-wall nanotube arrays MICHAEL STADERMANN, SARAH SHERLOCK, BRIAN DICK, HYUNG-GYU PARK, ALEXANDER ARTYUKHIN, WILLIAM PITZ, ALEXANDER NOY, OL-GICA BAKAJIN, Lawrence Livermore National Laboratory — Due to various difficulties, carbon nanotube arrays have seen only limited use in industrial applications to date. One of the difficulties is the reproducible growth of these arrays, let alone a good measure of control over the obtained height. In this work, we have preformed a parametric study of multi-wall carbon nanotube (MWNT) growth. The investigated parameters were gas flow rate, process pressure, and water content of the feed gas. We were able to identify a region in the parameter space that yields stable and highly reproducible growth of tall nanotubes arrays. As a result, we can controllably grow MWNT forests to any height between 1  $\mu$ m and 1 mm by choosing the right combination of pressure, humidity, flow rate, and growth time. Additionally, we were able to perform kinetic studies of the carbon nanotube growth, and our results suggest that the precursor for nanotube growth is formed in the gas phase.

> Michael Stadermann Lawrence Livermore National Laboratory

Date submitted: 30 Nov 2005

Electronic form version 1.4