

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effect of catalyst preparation on diameter of single-walled carbon nanotubes synthesized by alcohol CVD THEERAPOL THURAKITSEREE, ERIK EINARSSON, The University of Tokyo, Tokyo 113-8656, Japan, RONG XIANG, Sun Yat-Sen University, Guangzhou 510275, China, SHINYA AIKAWA, SHOHEI CHIASHI, JUNICHIRO SHIOMI, SHIGEO MARUYAMA, The University of Tokyo, Tokyo 113-8656, Japan — We investigated the effect of various aspects of the catalyst preparation procedure on the diameters of SWNTs synthesized by the alcohol CVD method. Prior to nanotube growth, a Co/Mo binary catalyst was deposited by dip-coating, and then reduced under flowing Ar/H₂ at temperatures ranging from 300 to 800 °C. We found that the mean SWNT diameter depends on both reduction time and temperature, with lower reduction temperature or short reduction time resulting in smaller diameter SWNTs. The morphology of SWNTs changed from vertically aligned for reduction temperatures above 500 °C to randomly aligned when reduction occurred below 500 °C. Introducing small amount of water during heating, the mean diameter of the SWNTs was also reduced despite synthesis at 800 °C. Small diameter SWNTs were synthesized with this new cobalt/rhodium (Co/Rh) catalyst. The average diameter SWNT is similar to that from Co/Fe catalysts and slightly smaller than HiPco.

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Date submitted: 18 Nov 2010

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