

Characterization of single-walled carbon nanotubes catalytically synthesized from alcohol

Shigeo Maruyama, Yoichi Murakami, Yuhei Miyauchi and Shohei Chiashi

maruyama@photon.t.u-tokyo.ac.jp

Department of Mechanical Engineering, The University of Tokyo, 7-3-1 Hongo,
Bunkyo-ku, Tokyo 113-8656, Japan

<http://www.photon.t.u-tokyo.ac.jp/~maruyama/nanotube.html>

High purity single-walled carbon nanotubes (SWNTs) were synthesized from ethanol by catalytic CVD method [1]. The yield of SWNTs was determined based on TGA complemented by Raman and TEM analyses. The effects of CVD reaction time and pre-reduction of catalytic metal on the yield and quality of synthesized SWNTs were investigated. The reduction of catalytic metal, which leads to effective enhancement of the yield, plays an important role in the synthesis of SWNTs. The SWNT yield of more than 40 % was achieved over the weight of zeolite support powder with Fe/Co catalyst, which corresponded to more than 800 % yield over the weight of the catalytic metal, within the CVD reaction time of 120 minutes assuring as-grown high quality. The optical absorption spectra and infrared fluorescence spectra of SWNTs generated by this alcohol CCVD technique are compared with the HiPco sample.

[1] S. Maruyama et al., Chem. Phys. Lett., 360 (2002) 229.