

Floated Catalytic CVD Generation of SWNTs from Alcohol

Shohei Chiashi, Satoshi Yoshinaga, Yuhei Miyauchi, Yoichi Murakami, Shigeo Maruyama

chiashi@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>

We have proposed the new catalytic CVD generation technique of SWNTs from alcohol [1, 2]. By using alcohol as a carbon source, high-purity SWNTs were produced at relatively low temperature (550-900 deg. C), probably because oxygen atoms contained in alcohol molecules prohibited the generation of side products. Here, it was demonstrated that the same mechanism was applicable to other configuration, a floated catalyst type generation of SWNTs. Using ferrocene as a precursor of floated iron catalyst clusters, high-purity SWNTs were generated from alcohol. Vapor of ferrocene ethanol solution (ferrocene concentration was about 0.1 wt %) was injected into a quartz tube, which was heated by an electronic furnace and pumped by a rotary vacuum pump. Keeping the pressure of quartz tube at about 200-400 Torr for a few minutes, black soot was collected at a trap located at downstream of quartz tube. Raman scattering, TEM, SEM and TGA showed the generation of high-quality SWNTs. This simple technique is expected to be an efficient low-cost generation technique of bulk SWNTs.

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

[2] Y. Murakami et al., Chem. Phys. Lett., in press.