In-Situ Measurements of Raman Scattering and AFM in Growth Stage of Single-Walled Carbon Nanotubes from Silicon Substrate

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Alcohol was found to be an excellent carbon source for single-walled carbon nanotubes (SWNTs) in catalytic CVD process [1]. In addition to the high-purity and high-quality products [2], the direct synthesis of SWNTs from metal catalysts on silicon or quartz substrates at relatively low-temperature was made possible [3]. Using this alcohol CCVD technique, in site observations of SWNTs growing in an atomic force microscope (AFM) sample stage was performed. In the temperature/atmosphere controllable AFM chamber, a silicon wafer or a quartz substrate dip-coated with metal particles [3] was heated to 800 °C in argon atmosphere, and after evacuation, ethanol gas was supplied. In addition to the in situ AFM measurement, Raman scattering was measured near the cantilever position through a micro-Raman system with a custom-made optics.

References: [1] S. Maruyama et al., Chem. Phys. Lett., 360 (2002), 229. [2] Y. Murakami et al., Chem. Phys. Lett. in press. [3] Y. Murakami et al., Chem. Phys. Lett., submitted.