

Synthesis of Single-walled carbon nanotubes rope using catalytic chemical vapor deposition method

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High-quality single-walled carbon nanotubes (SWNTs) have been produced without defects and amorphous carbonaceous particles by catalytic chemical vapor deposition method at 800°C in high yield. As-synthesized carbon materials mainly consist of SWNT bundles with a diameter 11-20 nm. The diameter of SWNT is in the range 1.1-1.8 nm. The SWNTs rope have uniform diameter about 1-4 μm and length up to several tens micrometer. We also investigate the crystallinity of SWNTs by Raman spectroscopy. We found that the Fe-Mo bimetallic catalyst was active as a very efficient catalyst for the synthesis of SWNTs rope with the catalytic vapor phase growth method. Our results also indicate that acetylene is a very ideal carbon source for the synthesis of SWNTs rope and MgO-supported Fe-Mo catalyst very easy to take off SWNTs. The catalytic vapor phase growth method may be the best choice for the high-quality, large-scale and low-costs production of SWNTs.