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Large-scale synthesis of DWNTs by catalytic decomposition of alcohol over Fe-Mo/MgO catalyst

S. H. Lee, S. C. Lyu, S. K. Choi, C. J. Lee
H. K. Kang*, C. W. Yang*
Department of Nanotechnology, Hanyang University
* Department of Advanced Materials Engineering, Sungkyunkwan University

Double-walled carbon nanotubes (DWNTs), which constituted by two graphene layers, have been produced by different techniques. This structure bridges the gap between the Single-walled carbon nanotubes (SWNTs) and the more complex multiwalled carbon nanotubes (MWNTs) that are made of many layers and offers the possibility to study the effects of the nanotubes.

We report that high-quality DWNTs have been produced by catalytic decomposition of alcohol over Fe-Mo / MgO catalyst at 900 ℃. The produced carbon materials are DWNT bundles free of amorphous carbon covering on the surface. The outer tube of DWNTs are in the range of 1.52 - 3.54 nm. The interlayer spacing between graphene layers is in the range of 0.34 - 0.41 nm. DWNTs can have different inner tube diameters for one outer tube diameter. Both HRTEM and Raman analysis indicate that the synthesized DWNTs have high quality. Our result also demonstrates that alcohol can be a very ideal carbon feedstock to produce DWNTs over MgO supported Fe-Mo bimetallic catalyst.