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Large-scale synthesis of high-purity single-walled carbon nanotubes produced by catalytic decomposition of xylene

Seung Il Jung[1], Su Hwan Lee[1], Jung Hee Cho[1], Min Ho Park[2], Cheol Woong Yang[2] and Cheol Jin Lee[1]

[1]Department of Nanotechnology, Hanyang University
[2]Department of Advanced Materials Engineering, Sungkyunkwan University

The synthesis of bulk amounts of high-purity single-walled carbon nanotubes(SWCNTs) was accomplished by catalytic decomposition of xylene over Fe-Mo/MgO catalyst. The amount of SWCNTs is over 90% of total carbon product obtained. Raman analysis indicated that the diameter of SWCNTs were in the range of 0.80-2.38 nm. Moreover, The small ratio of $I_{(D)}/I_{(G)}$ proved that the as-synthesized SWCNTs have low defect levels in atomic carbon structures. The measured TGA profile shows that relatively little amorphous carbon is present in our raw sample. TEM observation indicated that the as-synthesized SWCNTs have well-resolved walls and no amorphous carbon deposits on the surface of SWCNTs. This process shows a promise for massive production of high-purity SWCNTs at low cost.

Our result indicates that xylene can be an ideal carbon source for a synthesis of high-purity SWCNTs.