

# Diameter and Chirality Distribution of SWNTs Grown from Zeolite Surfaces

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Zeolites are microporous, crystalline aluminosilicates constructed from tetrahedral base units. We have been using the *b*-surfaces of silicalite-1 zeolite (framework: MFI) as catalyst support for catalytic CVD growth of single-walled carbon nanotubes (SWNTs). Figure 1a shows an FE-SEM image of the zeolite crystals directly synthesized on a Ti-deposited quartz substrate. We sputtered Co and grew SWNTs by alcohol CVD method. SWNTs were grown only from the top surfaces (i.e., *b*-surfaces) of the crystals since the underneath Ti layer suppressed the catalyst activity of Co. Figure 1b shows an example of suspended SWNTs between top surfaces of the adjacent crystals. In addition, we develop crystalline silicate layers, prepared such as by delaminating ITQ-2 layered material [1], for catalyst support in the SWNT growth.

The diameter/chirality distribution of obtained SWNTs is directly determined by characterizing suspended individual SWNTs one by one with micro-photoluminescence spectroscopy (Fig. 2). We discuss the effect of catalytic CVD conditions as well as the support material on the resultant diameter/chirality distribution.

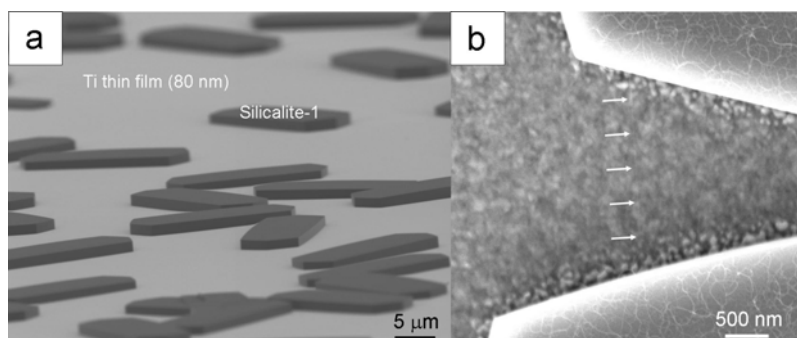


Fig. 1: FE-SEM images of the sample. (a) Silicalite-1 crystals directly grown on a Ti-deposited quartz substrate. (b) Suspended SWNT between top surfaces of two adjacent silicalite-1 crystals (indicated by arrows).

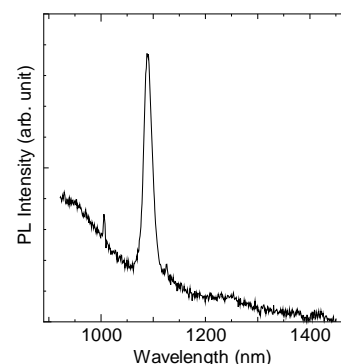


Fig.2: Typical photoluminescence emission measured from a suspended individual SWNT.

[1] A. Corma et al., *Microporous Mesoporous Mater.* **38** (2000) 201

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