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Raman spectra and thermal stability analysis of 0.4 nm free-standing single-walled carbon nanotubes JIAN TING YE, ZI KANG TANG, Department of Physics and Institute of Nano Science and Technology, Hong Kong University of Science and Technology, SEMICONDUCTOR CLUSTER TEAM — Thermal stability of ultra-small 0.4 nm single-walled carbon nanotubes is studied by means of Raman scattering measurement under vacuum. The 0.4 nm SWNTs are very stable when they are confined inside the channels of the AFI crystal. When these SWNTs are extracted from the channels into free space, however, they become thermally unstable because of the strong curvature effect. All three structures of the 0.4 nm-sized SWNTs are destroyed between 730 to 790 K, a temperature range much lower than that of large-sized SWNTs. The (5,0) tube is only destroyed after temperature reaches 790 K and seems slightly stabler than the other two structures: the (3,3) and (4,2) tubes.

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