Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

In-situ TEM study of collapsing, reinflating and twisting of multi-walled carbon nanotubes AIMING YAN, Dept. of Physics, Univ of California - Berkeley; Materials Science Division, Lawrence Berkeley National Laboratory, Berkeley, HAMID BARZEGAR, Dept of Physics, Umea University, 90187 Umea, Sweden, CLAUDIA OJEDA-ARISTIZABAL, GABRIEL DUNN, Dept. of Physics, Univ of California - Berkeley, THOMAS WAGBERG, Dept. of Physics, Umea University, 90187 Umea, Sweden , ALEX ZETTL[1], Dept. of Physics, Univ of California - Berkeley; Materials Science Division, Lawrence Berkeley National Laboratory, Berkeley; — Since the first observation of collapsed carbon nanotubes (CCNTs) by Chopra et al., CCNTs have attracted a lot of attention due to their potentially modified electrical properties caused by structural changes compared to their tubular counterparts. We study the transition of multi-walled carbon nanotubes (MWCNTs) from tubular to collapsed form and the reverse process in-situ by Transmission Electron Microscope (TEM) and monitor the whole process by imaging and electron diffraction. We show that we are able to collapse the tubular CNT by extracting the inner core of the tube and reinflate the collapsed carbon nanotube by applying a voltage at the tip of the CNT. We also observe the twisting of the collapsed multi-walled CNT in-situ. The nano-scale manipulation of carbon nanotubes inside TEM enables us to tailor the transition between tubular and collapsed forms of a CNT.

[1]Kavli Energy NanoSciences Institute at the Univ of California, Berkeley and the Lawrence Berkeley National Laboratory, Berkeley; Center of Integrated Nanomechanical Systems, Univ of California, Berkeley

Aiming Yan
Univ of California - Berkeley

Date submitted: 14 Nov 2014 Electronic form version 1.4