

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Origin of Compressive Strain Induced Electromechanical Oscillations in Multiwalled Carbon Nanotubes SWASTIBRATA BHATTACHARYYA, LAISHRAM SINGH, KARUNA NANDA, ABHISHEK SINGH, Materials Research Centre, Indian Institute of Science, Bangalore 560012, India — We show by the application of compressive strain, the electrical conductance of multiwalled carbon nanotubes can be increased monotonically. The strain induces oscillations in electrical conductance, which can have potential applications in many electromechanical nanodevices. While the monotonic increase in the conduction is due to the intra-wall interaction of the nanotubes, the oscillations are caused by the transition from sp^2 to sp^3 hybridization of the carbon atoms, promoted by the inter-wall interaction. A series of experimental and theoretical analyses based on density functional tight binding method were performed to confirm this finding. These results opens up a possibility of enhancing the conductance of carbon nanotubes by controlling applied strains.

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Date submitted: 27 Nov 2012

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