



Mechanics of Nanostructures

Rodney S. Ruoff

Northwestern University, USA

The topics will be (I) Experimental studies by my group of carbon nanotubes and nanocoils, boron nanowires, and carbon nanotubes projecting from the fracture surfaces of CNT composites (a) subjected to tensile loading (b) driven into mechanical resonance by mechanical or electrical excitation. (II) The ideal strength of materials and fracture in nanostructures (a) ab initio calculations of ideal strength (b) experimental work on nanostructure fracture (c) modeling of the fracture strength of nanostructures with 0, 1, 2 adjacent, 3 adjacent, ?, n adjacent defects (d) following this summary of prior work, a new theory (developed with Nicola Pugno, Politecnico di Torino) for fracture of nanoscale structures will be presented. (III). We close with discussion of a new method that my group is developing, for achieving nm-resolution for measurements of the displacement field. I acknowledge grant support from NASA LaRC, NSF, and ONR.