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Exploring the Fundamental Properties of Carbon Nanotubes using Electromechanical Resonators MEHMET AYKOL, WILLIAM BRANHAM, SHUN-WEN CHANG, ROHAN DHALL, STEPHEN B. CRONIN, University of Southern California — By monitoring the nanoelectromechanical (NEM) response of suspended individual carbon nanotubes (CNT), we measure the expansion coefficient of individual suspended single-walled CNTs. Here, the temperature dependence of the mechanical resonance frequency of NEM CNT resonator is used to determine the change in tension on the device caused by the expansion on the nanotube. We also measured the effects of gas adsorption on the CNT surface, by measuring change in conductivity and its response to gate doping. By monitoring the mass loading on the surface of the resonator we calculate the adsorption energy of the specific gasses on the surface of the nanotube.

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