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Gas sensing behavior of individual carbon nanotube field effect transistors MICHAEL STADERMANN, ALEXANDER ARTYUKHIN, OLGICA BAKAJIN, ALEKSANDR NOY, Lawrence Livermore National Laboratory — Carbon nanotube field effect transistors (FETs) have been found to be gas sensors with amazing sensitivity. Thus far, however, the exact sensing mechanism of the devices remains unknown. Recent results indicate that the analytes may bind to defects in the nanotubes and change their conductance through charge transfer, but all of these measurements have been performed in networks of carbon nanotubes, in which the properties of the network rather than those of the individual tube are measured. In this work, we study the behavior of individual nanotube devices. We measure the response times of both pristine as well as damaged nanotubes to determine the effect of defects on the sensor response, and we measure devices with coated and uncoated electrodes to determine the contribution of the contacts.

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