Carbon nanotube field effect transistors (CNFETs) are extremely sensitive chemiresistors. Although their chemical sensing properties were discovered more than 10 years ago [1], the physical mechanism underlying their response is still unclear. Electrical changes can be caused either by charge transfer between adsorbed gas molecules and the nanotube channel, or by changes at the Schottky barriers between the carbon nanotube and the metal contacts. Previous work showed that in the case of sensors made with individual nanotubes, the response to NO\textsubscript{2} and NH\textsubscript{3} is mainly due to Schottky barrier modulation [2, 3].

Here we present numerical simulation based on existing models [4] to analyze the data by using measurements of metals work functions and their changes under gas exposure. Furthermore, we study the sensing mechanism of CNFETs where the channel is made of nanotube networks. We find that this case the carbon nanotube channel substantially contributes to the CNFET response. We explain the different behavior of CNFETs made with individual nanotubes vs. networks by considering gas adsorption occurring at the junctions between nanotubes forming the network.