Carbon Nanotube-Based Gas Sensors

A. Carella, L. Caillier, C. Celle, J.-P. Simonato

CEA Grenoble, Liten/DTNM/LCRE
17 rue des martyrs, F-38054 Grenoble cedex 9

Since their rediscovery in 1991, carbon nanotubes have emerged as an active area of research. Their promising properties for gas sensing applications have been pointed out in 2000. Since then, a great deal of effort has been devoted to this new kind of sensors. Carbon nanotubes have been integrated in microelectronic devices such as field effect transistors (CNTFET),[1] capacitors[2] and resistors[3]. Among them, resistors are the easiest to produce since they require only two electrodes connected by a carbon nanotube network. Carbon nanotube-based gas sensors have shown a great sensitivity but they often suffer from a lack of selectivity. To circumvent this issue, post-functionalization of carbon nanotube-based sensors with organometallic species and pyrene derivatives have been made. Gas detection from these devices has been performed towards NH_3, CO, and NO_2 gases.

[1] R. Martel, P. Avouris, *Appl. Phys. Lett.* **1998**, *73*, 2447
[2] E. S. Snow et al, *Science* **2005**, *307*, 1942
[3] I. Sagayo et al, *Talanta*, **2008**, *77*, 758