

PD-FUNCTIONALIZED CARBON NANOTUBE NETWORKS AS SELECTIVE HYDROGEN SENSORS

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Carbon nanotubes are promising materials to be utilized as components for gas- and chemical sensors because of their high surface area, hollow geometry, and electronic properties. We here report the fabrication of selective carbon nanotube-based hydrogen sensors by simply airbrushing Pd-functionalized single-walled carbon nanotube (SWNT) dispersions on alumina substrates. The hydrogen sensing capabilities of the resulting thin films were evaluated by dc electrical measurements in nitrogen and air atmospheres. Pd-functionalization of the employed SWNTs enabled increasing the device sensitivity to hydrogen. The fabricated sensors exhibited good sensitivity and selectivity to hydrogen at room temperature in reversible and reproducible hydrogen detection processes. The response to hydrogen and the cross-sensitivity to interfering gases such as ammonia, toluene and octane were studied. The effect of aging, thermal treatment and the employed carrier gases on the sensor performance were also investigated.

References:

- [1] I. Sayago, E. Terrado, E. Lafuente, M. C. Horrillo, W. K. Maser, A. M. Benito, R. Navarro, E. P. Urriolabeitia, M. T. Martinez, and J. Gutierrez, *Synthetic Metals*, **148** (2005) 15.