

Novel gas sensors based on carbon nanotube films

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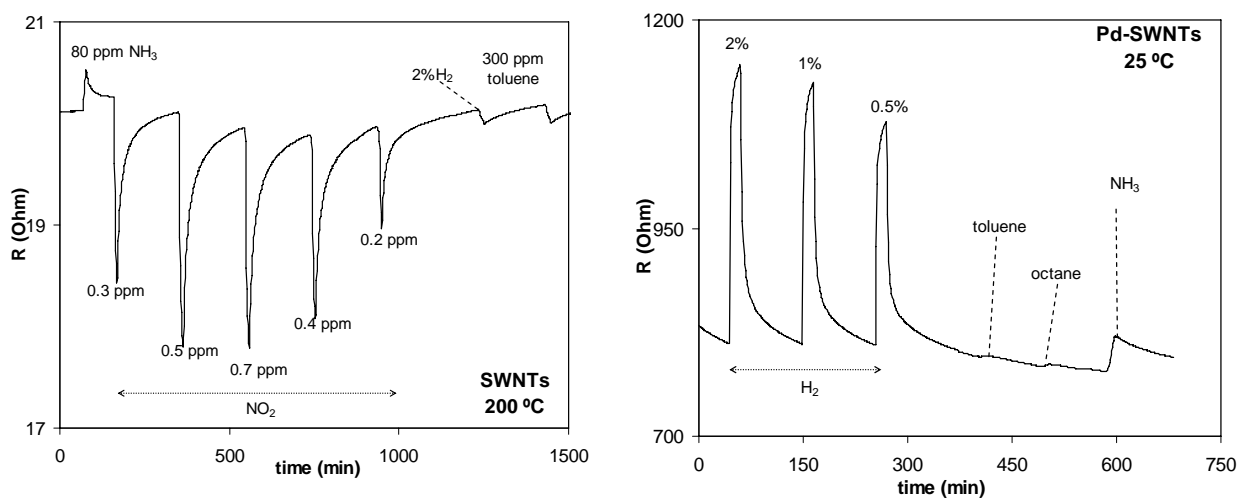
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Abstract

Novel resistive gas sensors based on single-walled carbon nanotubes (SWNTs) as the active sensing element have been researched for gas detection (H_2 and NO_2). SWNTs were produced by arc-discharge and deposited on alumina substrates by airbrush. Two different SWNTs materials were used as sensitive layers: Pd-functionalized SWNTs and SWNTs. The response to NO_2 and H_2 and the cross-sensitivity to gases such as ammonia, toluene and octane were studied.

Sensors were characterized by dc electrical measurements in air atmosphere at different temperatures. Detections were carried out with a constant flow of 200 ml/min and exposure times of 15 min. Gas concentrations were modified from 0.1 to 2 % for H_2 and 0.1 to 0.9 ppm for NO_2 . Concentrations of interfering gases were 100, 400, and 300 ppm for ammonia, toluene and octane, respectively.

The best responses were obtained for SWNTs sensors to NO_2 and for Pd-functionalized SWNTs sensors to H_2 . Moreover, these sensors provided no response to interfering gases such as H_2 , NH_3 , toluene and octane.



Response curves of the sensors.