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# **Anchoring ultrafine Pd nanoparticles and SnO<sub>2</sub> nanoparticles on reduced graphene oxide for high-performance room temperature NO<sub>2</sub> sensing**

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## **Abstract**

In this paper, we demonstrate room-temperature NO<sub>2</sub> gas sensors using Pd nanoparticles (NPs) and SnO<sub>2</sub> NPs decorated reduced graphene oxide (Pd-SnO<sub>2</sub>-RGO) hybrids as sensing materials. It is found that ultrafine Pd NPs and SnO<sub>2</sub> NPs with particle sizes of 3-5 nm are attached to RGO nanosheets. Compared to SnO<sub>2</sub>-RGO hybrids, the sensor based on Pd-SnO<sub>2</sub>-RGO hybrids exhibited higher sensitivity at room temperature, where the response to 1 ppm NO<sub>2</sub> was 3.92 with the response time and recovery time being 13 s and 105 s. Moreover, such sensor exhibited excellent selectivity, and low detection limit (50 ppb). In addition to high transport capability of RGO as well as excellent NO<sub>2</sub> adsorption ability derived from ultrafine SnO<sub>2</sub> NPs and Pd NPs, the superior sensing performances of the hybrids were attributed to the synergetic effect of Pd NPs, SnO<sub>2</sub> NPs and RGO. Particularly, the excellent sensing performances were

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