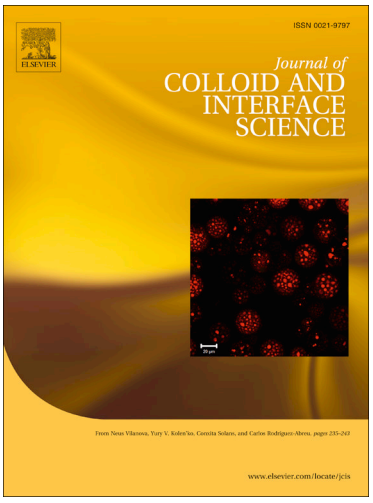

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Anchoring ultrafine Pd nanoparticles and SnO_2 nanoparticles on reduced graphene oxide for high-performance room temperature NO_2 sensing

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Abstract

In this paper, we demonstrate room-temperature NO_2 gas sensors using Pd nanoparticles (NPs) and SnO_2 NPs decorated reduced graphene oxide (Pd-SnO_2-RGO) hybrids as sensing materials. It is found that ultrafine Pd NPs and SnO_2 NPs with particle sizes of 3-5 nm are attached to RGO nanosheets. Compared to SnO_2-RGO hybrids, the sensor based on Pd-SnO_2-RGO hybrids exhibited higher sensitivity at room temperature, where the response to 1 ppm NO_2 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_2 adsorption ability derived from ultrafine SnO_2 NPs and Pd NPs, the superior sensing performances of the hybrids were attributed to the synergetic effect of Pd NPs, SnO_2 NPs and RGO. Particularly, the excellent sensing performances were