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## Incorporation of carbon nanotube and graphene in ZnO nanorods-based hydrogen gas sensor

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### Abstract

In this study, ZnO nanorods (NRs) were grown using solgel/hydrothermal methods on SiO<sub>2</sub>, carbon nanotube (CNT)/SiO<sub>2</sub>, and graphene/SiO<sub>2</sub> substrates to form hydrogen gas sensing chips. Results indicate that ZnO NRs/CNT/SiO<sub>2</sub> structures exhibited better H<sub>2</sub> sensing performance than the other two types of ZnO NRs-based structures. Furthermore, multiple electrical and material characterizations show that ZnO NRs/CNT/SiO<sub>2</sub> structures had a stronger (002) crystalline phase, with nanorod fusion near the bottom, and more oxygen-related defects. Owing to their small size, simple fabrication, and low cost, the ZnO NRs/CNT/SiO<sub>2</sub> based H<sub>2</sub> gas sensors are promising for future industrial H<sub>2</sub> sensing applications.

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