Title:	ZnO decorated luminescent graphene as a potential gas sensor at room temperature
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Abstract:	We present a simplistic single step synthesis and a detailed study of the remarkable room temperature gas sensing and photoluminescence (PL) properties of zinc oxide (ZnO) decorated graphene oxide sheets (GrO). Investigation of opto-electronic properties reveal near UV to blue PL and semiconducting behavior of ZnO–GrO sheets. ZnO nano-crystallites serve the dual purpose of acting as a nano-spacer between dried graphene sheets as well as a primary sensing transducer for the gas sensing applications. PL has been used as a tool to study the defects associated with the surface of the nanocrystallite's trap levels and/or acceptor–donor recombinations. Time-resolved PL was used to determine free carrier or exciton lifetimes, a vital parameter related to quality of composite and device performance. Results are presented for the detection of common industrial toxins like CO, NH3 and NO for concentrations as low as 1 ppm at room temperature. A large sensor response and quick recovery time was observed at room temperature with preferred selectivity towards electron donor gases like CO and NH3.
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