

Abstract Submitted
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Fabrication and Investigation of resonance frequency sensitive Graphene/ZnO based gas sensor in room temperature MEHDI NAMAZI, Physics and Astronomy department, Stony Brook University, SEYYED MOHSEN JEBREIL KHADEM, YASER ABDI, Nanophysics Research Laboratory, Department of Physics, University of Tehran, SARA DARBARI, FATEMEH OSTOVARI, ECE Department, University of Tarbiat Modares — Graphene/ZnO hybrid was used to fabricate a highly selective and sensitive gas sensor. ZnO nanowires in the structure have three important roles: reduction of graphene oxide to obtain graphene, acting as sensing element and mechanical actuation using their piezoelectric properties. A selected set of chemicals vapors was tested on the fabricated sensor. We have found that chemical vapors change the resonance frequency of the graphene/ZnO in addition to the electrical resistivity of the structure. Variation of the mechanical and electrical characteristics of the graphene/ZnO due to gas exposure make the graphene/ZnO based sensors highly selective and reliable device for gas sensing with distinctive signatures for specific gases. We have introduced an alternative frequency modulation gas detection method here in which the gas absorption on the graphene/ZnO can affect resonance frequency of the ZnO nanowires. Such alternative method can be utilized for detection of absorbed gases which do not change the resistivity of the sensing element significantly. Also the sensitivity of the graphene/ZnO based gas sensor was investigated under mechanical actuation.

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