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- (54) **FABRICATION OF ZNO NANOROD-BASED HYDROGEN GAS NANOSENSOR**
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- (52) **U.S. Cl.** **422/83**
- (58) **Field of Classification Search** None
See application file for complete search history.

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(57) **ABSTRACT**

The nanofabrication of a hydrogen gas nanosensor device from single straight and branched, tripod shaped ZnO nanorods using in-situ lift-out technique, performed in the chamber of a focused ion beam (FIB) system is disclosed. Self-assembled ZnO branched nanorods have been grown by a cost-effective and fast synthesis route using an aqueous solution deposition method and rapid thermal processing. The properties of the ZnO nanorod structures were analyzed by X-ray diffraction, scanning electron microscopy, energy dispersion X-ray spectroscopy, transmission electron microscopy and micro-Raman spectroscopy. High quality ZnO nanorods were obtained with a 90% success rate for building nanodevices. The fabricated nanosensor can gauge 150 ppm hydrogen gas in the air at room temperature. The nanosensor has selectivity for other gases such as oxygen, methane, carbon monoxide and liquid propane gas. The ZnO nanorod sensors of the present invention also operate at low power of less than 5 microwatts.