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Hydrogen-Selective Sensing at Room Temperature with Pt-Coated ZnO Nanorods HUNG-TA WANG, BYOUNG SAM KANG, FAN REN, University of Florida, Chemical Engineering, LI-CHIA TIEN, PATRICK SADIK, DAVID NORTON, STEPHEN PEARTON, University of Florida, Material Science and Engineering, JENSHEN LIN, University of Florida, Electrical and Computer Engineering, UNIVERSITY OF FLORIDA, CHEMICAL ENGINEERING COLLABORATION, UNIVERSITY OF FLORIDA, MATERIAL SCIENCE AND ENGINEERING COLLABORATION, UNIVERSITY OF FLORIDA, ELECTRICAL AND COMPUTER ENGINEERING COLLABORATION — The sensitivity for detecting hydrogen with multiple ZnO nanorods is found to be greatly enhanced by sputter-depositing clusters of Pt on the surface. The resulting structures show a change in room temperature resistance upon exposure to hydrogen concentrations in nitrogen of 10-500 ppm approximately a factor of 10 larger than without Pt. Pt-coated ZnO nanorods detected hydrogen down to 10 ppm, with relative responses larger than 0.026 at 10 ppm and larger than 0.085 at 500 ppm hydrogen in nitrogen after 10 min exposure. There was no response at room temperature to oxygen. Approximately 0.95 of the initial ZnO conductance after exposure to hydrogen was recovered within 20s by exposing the nanorods to either air or pure oxygen. This rapid and easy recoverability make the Pt-coated nanorods suitable for practical applications in hydrogen-selective sensing at ppm levels at room temperature with the power consumption less than 0.3 mW.

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