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Conductance and Photoconductance of Indium Oxide-Zinc Oxide Composites in the Hydrogen-Containing Atmosphere

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Photovoltaic properties of composites based on nanocrystalline indium and zinc oxides, promising as sensitive elements of gas sensors, were investigated. It is shown that under visible light the conductivity of composites changes with the change of hydrogen concentration in the environment even at room temperature, which allows the use of composites to detect hydrogen without heating. The curves of the kinetics of photoconductivity of the composites are studied and possible mechanisms of photoconductivity are analyzed. The mechanism of the sensor response of composites under illumination is proposed. The mechanism considers the illumination turns the composite into nonequilibrium state and the photoconductivity change in the H₂ atmosphere is linked with alteration of nonequilibrium charge carriers recombination rate.