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UV effect on NO₂ Sensing Properties of Nanocrystalline In₂O₃

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Nanocrystalline indium oxide films with extremely small grains in range of 7 to 40 nm were prepared by sol-gel method. The influence of grain size on the sensitivity of indium oxide to nitrogen dioxide in low concentration at room temperature was investigated under the UV illumination and without illumination. The sensitivity increases with the decrease of grain sizes when In₂O₃ is illuminated while in the dark In₂O₃ with intermediate grain size exhibits the highest response. An explanation of the different behavior of the In₂O₃ with different grain size sensitivity to NO₂ under illumination and in the dark is proposed. The pulsed illumination is demonstrated may be used for NO₂ detection at room temperature that significantly reduces the power consumption of sensor.