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Effects of defects on gas sensor performance of β -Ga₂O₃

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The gas sensing performance of a material partly depends on its defect property, especially the oxygen vacancy (VO) content [1]. The trace amounts of common impurities such as Cr³⁺ and N in Ga₂O₃ nanostructures significantly influence their defect-emission profiles [2,3]. In this work, we investigated the effect of unintentionally doped Cr³⁺ and N defects in conjunction with the intrinsic donor (VO) and acceptor (VGa) defects on the gas sensing performance of β -Ga₂O₃ nanorods. The photoluminescence and gas sensing results demonstrate a significant influence on the response/recovery times from the unintentionally doped Cr³⁺ and N defects in β -Ga₂O₃. Fast response times are key in rapid detection of toxic gases such as CO and quick recovery is important for reusability of the sensing material.

Keywords: Ga₂O₃; intrinsic defects; oxygen/gallium vacancies; gas sensing.

References

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Apply to be considered for a student ; award (Yes / No)?

Yes

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PhD

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