

Responsivity and detectivity of Zn_{0.8}Mg_{0.2}O/p-Si prepared by spin coating and aerosol deposition method

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ZnMgO solid solutions system presents interest for optoelectronic application due to possibilities to tailor many important physical properties by varying their composition [1]. In this paper, we present data concerning responsivity and detectivity of Zn_{0.8}Mg_{0.2}O/p-Si photodetectors based on thin films prepared by spin-coating and aerosol deposition methods from 0.35 M aqueous solution using Zn and Mg acetates. The morphological and chemical composition of films has been investigated in details by scanning electron microscopy (SEM) and Energy Dispersive X-ray analysis (EDX). The photoelectrical parameters of detectors (Fig. 1) have been deduced from current-voltage characteristics measured in the dark and under UV illumination.

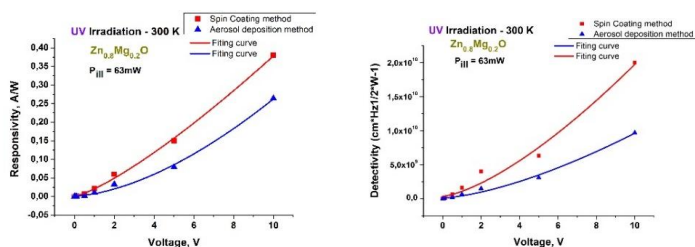


Figure 1. The responsivity and detectivity under different bias voltage of ZnMgO/p-Si thin films

The photocurrent was generated by a xenon DKSS-150 lamp using an optical filter ($\lambda_{\text{FC5-300 nm}}$). The responsivity (R) and detectivity (D^*) under UV illumination of 63 mW/cm² and 10 V direct bias were found to be of $R = 0.38 \text{ A/W}$, $D^* = 2 \times 10^{10} \text{ cm}^2\text{Hz}^{1/2}\text{W}^{-1}$ for films deposited by spin coating; and $R = 0.264 \text{ A/W}$, $D^* = 9.7 \times 10^9 \text{ cm}^2\text{Hz}^{1/2}\text{W}^{-1}$ for films prepared by aerosol deposition.

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References

1. V. Morari, et al. Electrical and photoelectrical properties of Zn_{1-x}Mg_xO thin films obtained by spin coating and aerosol deposition method. **IFMBE Proceedings**, V. 77, p.105-109, (2020). DOI-10.1007/978-3-030-31866-6

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