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## Photoresponse and photocapacitor properties of Au/AZO/p-Si/Al diode with AZO film prepared by pulsed laser deposition (PLD) method

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### Abstract

The electrical and photoresponse properties of Au/nanostructure AZO/p-Si/Al diode were investigated. Al-doped ZnO (AZO) thin films were deposited via pulsed laser deposition method on silicon substrate. Structural properties of the films were performed by using transmission electron microscopy and X-ray powder diffraction (XRD). The XRD patterns showed that the AZO films are polycrystalline with hexagonal wurtzite structure preferentially oriented in (002) direction. Electrical and photoresponse properties of the diode were analyzed under in a wide range of frequencies and illumination intensities. It is observed that the reverse current of the diode increases with increasing illumination intensity. This result confirms that the diode exhibits both photoconducting and photovoltaic behavior. Also, the transient photocurrent, photocapacitance and photoconductance measured as a function of time highly depend on transient illumination. In addition, the frequency dependence of capacitance and conductance is attributed to the presence of interface states.

### Keywords

**KeyWords Plus:** ZNO THIN-FILMS; SOL-GEL METHOD; A-SI-H; PHOTOCONDUCTING PROPERTIES; LUMINESCENCE PROPERTIES; ELECTRICAL-PROPERTIES; OPTICAL-PROPERTIES; TRANSPARENT; PHOTODIODE; HETEROJUNCTION

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