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Characterization of defects in ZnO implanted with Ar⁺ using positron annihilation technique.

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ZnO (wurtzite) samples were implanted with Ar⁺ ions to generate intrinsic defects within the ZnO samples at fluence range from 1×10^{15} to 3×10^{16} ions.cm⁻². Doppler broadening of the annihilation curves were obtained to determine S-parameters which are used to characterize the defects. S-parameters are 0.35795, 0.35809 and 0.39025 for the lowest to the highest fluence, respectively. X-ray diffraction method was employed to determine any structural damage or phase change during the implantation. Positron annihilation spectroscopy shows the formation of anion point defects. Optical absorption measurements suggest the presence of F aggregate centres at 300.0 nm (4.14 eV). Theoretical calculations of the annihilation curves, based on local density approximation as well as generalized gradient approximation, were obtained. Theoretical results compare well with experimental results. Positron annihilation measurements are also correlated with optical absorption results on Ar⁺ ion implanted zinc oxide crystal.

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

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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