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The study of amorphous GaAs following Ar⁺ and Si⁺ implantation

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Ion implantation is a technique of choice for inducing disorder in semiconducting materials such as crystalline GaAs. Interestingly, the properties of these amorphous materials such as the medium-range order (MRO) and small range order (SRO) depend heavily on the material of interest and its implantation conditions. Understanding the crystalline to amorphous phase transformations is vital for the continued use of GaAs in optoelectronic applications. In the present work, the configuration of the disordered layer in GaAs is generated using Ar⁺ and Si⁺ ions at different energies and different fluences, and the elastic properties are investigated. Raman spectroscopy was used to determine the structural configurations and phonon confinement of the damage layers after ion implantation. The crystal structure and the physical properties were determined using GIXRD and XRR for phonon dispersion simulations. The dynamics of acoustic propagation of the disordered layer are investigated using surface Brillouin scattering in the backscattering geometry. The derived phonon dispersion curves are fitted using surface elastodynamic Green's function to yield the elastic constants of the disordered layers on (001) GaAs substrate.

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

Yes

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

MSc

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