

Structural Control and Electrical Property Modulation of γ -GeSe via Ion Beam Implantation

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γ -GeSe, a newly discovered hexagonal polymorph from the group IV–VI monochalcogenides, has attracted significant attention due to its unique bonding configuration and high electrical conductivity by Ge vacancies. This material exhibits intriguing metallic behavior, making it a promising candidate for electronic and thermoelectric applications. In this study, we investigated the structural control and electrical property changes in γ -GeSe through ion beam implantation of Mn, Cr, and Ti. We implanted Mn, Cr, and Ti ions at energies of 20–30 keV with fluences of $1E14$ to $1E16$ ions/cm², resulting in the amorphization of the upper tens of nanometers of γ -GeSe. By annealing, we successfully controlled the recrystallization of this amorphous layer to form either γ -phase or α -phase GeSe, depending on the conditions, enabling the creation of heterostructures. The effects of this structural control on the electrical properties of γ -GeSe are currently under investigation, with potential implications for advanced semiconductor applications.

Contribution track

KOPUA

Paper submission Plan

Best Presentation

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