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Effects of helium (He) in the migration behavior of silver (Ag) implanted into polycrystalline SiC

Effects of helium (He) in the migration behaviour of silver (Ag) implanted into polycrystalline silicon carbide (SiC) were investigated. Sliver ions at 360 keV were implanted into SiC to a fluence of 2 × 1016 cm-2 at 350 oC. Some of the as-implanted samples were then implanted with helium (He) ions of 17 keV to a fluence of 1 × 1017 cm-2 at 350 oC. The Ag implanted and He & Ag co-implanted samples were annealed at 1000°C and 1100°C for 5 hours. The structural and morphological evolutions in the as-implanted and annealed samples were characterized by Raman spectroscopy and scanning electron microscopy (SEM) while the migration of implanted species was monitored by elastic recoil detection analysis (ERDA). Implantation and co-implantation resulted in the formation of defects with no amorphization. Annealing at 1000oC resulted in some healing of defects. This annealing of defects progressed with annealing temperature. SEM micrographs of the co-implanted samples had cavities due to burst of He bubbles while no significant changes were observed in the Ag only implanted SiC. The number of cavities increased with annealing temperatures. Migration of silver was observed in the co-implanted samples annealed at 1100 oC and no migration of Ag was observed in the Ag implanted samples. Hence He bubbles assisted the migration of Ag.

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

Yes

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

MSc

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