

Effect of alloy composition on track formation in relaxed $\text{Si}_{1-x}\text{Ge}_x$

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Strain-relaxed single-crystalline $\text{Si}_{1-x}\text{Ge}_x$ alloy layers of different compositions ($0 < x \leq 1$) were irradiated with 0.7-GeV U ions in the electronic stopping power regime. Transmission electron microscopy reveals extended defects which develop into discontinuous tracks for $0.3 \leq x \leq 0.8$. The defect density and morphology depend significantly on the composition of the alloy, with highest formation probability at $x \sim 0.5$. Taking into account the composition dependence of the electron mobility and the mean phonon path in these alloys, the results are discussed within the frame of the thermal-spike approach assuming track melting and imperfect recrystallization.