# HALL-EFFECT STUDY OF DISORDERED REGIONS IN PROTON-IRRADIATED $n$-Si CRYSTALS

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S u m m a r y

The nature and dimensions of disordered regions emerged in $n$-Si single crystals irradiated with high-energy (25 MeV) protons have been studied by carrying out Hall measurements of their electrophysical parameters. Specimens fabricated with the use of the zone-melting technique and doped with phosphorus to a concentration of $6 \times 10^{13}$ cm$^{-3}$ are investigated. Irradiation was carried out at room temperature to exposure doses of $(1.8 \div 8.1) \times 10^{12}$ cm$^{-2}$. Depending on the irradiation dose and the temperature of isochronous annealing, some specimens irradiated with high-energy protons revealed a drastic increase of the effective Hall mobility $\mu_{\text{eff}}$, which is explained by the emergence of "metallic" inclusions in them, i.e. regions with the conductivity considerably higher in comparison with that of the semiconductor matrix. The radius of those regions was estimated to be $R_m < 80$ nm. An assumption was made that the "metallic" inclusions are nano-sized atomic clusters.