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Thermal evolution of End Of Range defects in Si and SiGe alloy.

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Abstract:

The aim of this work is to study the thermal evolution and the transformation of extended defects in Si and in relaxed SiGe alloy layers with various Ge contents (20, 35 and 50 at. %), obtained after a preamorphization step by ion implantation (35 keV Ge^+, $1.10^{15}cm^{-2}$), followed by thermal annealing at 680 °C and 800 °C. The Transmission Electron Microscopy in Weak Beam Dark Field mode, which gives better resolution, is used to identify and study the kinetics of formation and dissolution of these defects. It was shown that the increase of the Ge content leads to a decrease in the density and the size of the {113} rod like defects. One can note also that the transformation of {113} defects to dislocation loops becomes more enhanced. We suggest that the overall decrease of the defects stability and the increase of the interstitial diffusivity in SiGe alloys (with respect to Si) are the main factors responsible for the observed effects in the relaxed SiGe alloys.

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