

Raman spectroscopy study of damages induced in polycrystalline Si₃N₄ by swift heavy ion irradiation

In this work the Raman spectroscopy method was used to study the radiation damage and associated internal mechanical stresses in polycrystalline silicon nitride (Si_3N_4). Si_3N_4 samples have been irradiated with swift heavy Xe and Bi ions with energies of 167 and 710 MeV, respectively, in the range of fluences from $1E11$ to $4.87E13\text{ ions/cm}^2$. The spectra of the cross-section of the irradiated region and the near-surface layer of the samples were registered at room temperature. The parameters of the FWHM - 205 cm^{-1} and peak position - 862 cm^{-1} were used to characterize the amorphization and mechanical stress level.

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