MAGNETIC MICROSTRUCTURE OF NEAR-SURFACE LAYERS OF EPITAXIAL FILMS OF IRON-YTTRIUM GARNET IMPLANTED BY PHOSPHORUS IONS

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S u m m a r y

On the basis of the data of conversion Mössbauer spectroscopy, the process of generation of radiation-induced defects in monocrystalline epitaxial films of iron-yttrium garnet (IYG) irradiated by P^+ ions with an energy of 65 keV and doses of 5×10^{14}, 1.8×10^{15}, and 1×10^{16} cm^{-2} is studied. The mechanisms of disordering of the crystal and magnetic microstructures of an implanted layer are considered. The interconnection of thermostimulated changes of the magnetic microstructure with a transformation of intracrystalline electric fields is studued. The presence of two magnetically nonequivalent positions of Fe^{3+} ions and paramagnetic Fe^{2+} ions in the tetrahedral sublattice of the near-surface layer of an IYG film is established. The spatial orientation of the magnetic moments of separate sublattices of iron is calculated. The changes in parameters of the superfine interaction after the implantation and annealing are traced and substantiated.