Amorphization of Helium Implanted YIG Films

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The mechanism of amorphization in helium implanted single crystalline YIG films was investigated. The possibility of the radiation disordered region formation in the film at helium implantation with energy of 100 keV is shown. It received distribution of the displaced matrix ions at high-energy helium ions collisions with target atoms. The formation of radiation disordered region with the greatest number of atoms observed in the near-surface area of the material, but the maximum number of them is at a depth of 370 nm.

It was calculated degree of amorphization Ω YIG film in dependence of the helium implantation dose according to [1]. With the value of Ω = 0,85 is the association of some amorphous zones in a continuous layer and amorphization dose for our experimental conditions will be $8 \cdot 10^{16}$ см$^{-2}$. In the range of doses $1 \cdot 10^{15}$-$1 \cdot 10^{16}$ He^{+}/см^2 the degree of amorphization of YIG film increases linearly from 0.02 to 0.21.

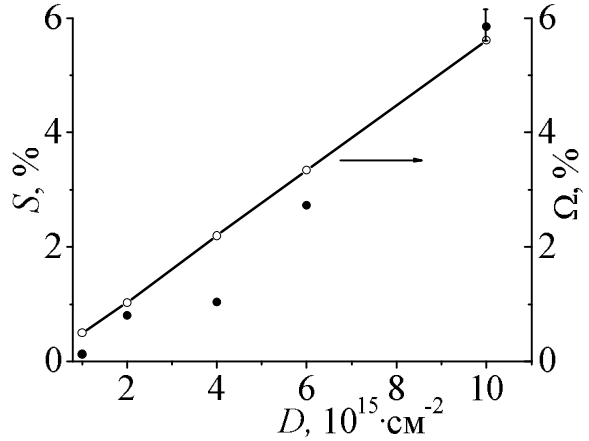

Fig. 1. The relative integral intensity of the paramagnetic doublet *S* in the CEM spectra and theoretically calculated degree of amorphization Ω as function of dose for helium implanted single crystalline YIG films

Radiation disordered regions at room temperature are represented as paramagnetic inclusions in ferrimagnetic matrix. Comparative analysis of the relative integral intensity of the paramagnetic doublet *S* in CEM spectra of implanted single crystalline YIG films and theoretically calculated degree of amorphization Ω at the dependence of helium ions dose (fig. 1) shows the consistency of theoretical calculations with experimental data.

1. A. Markelis, L. Pranevičius. On mechanism of suppression of hard bubbles in garnet films // *Lietuvos fizikos rinkinys*, **18** (5) pp. 647-652 (1978).