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Garnet structures studies following eMS. Results and perspectives.

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Synthetic crystalline garnets doped with the rare-earth elements are commonly used as a host materials in acoustic transmitters and numerous nonlinear optics applications because of their ability to generate ultra short pulses. ^{57}Fe emission Mössbauer spectroscopy (eMS) following implantation of ^{57}Mn ($T_{1/2} = 1.5$ min.) in the temperature range from 298 K to 798 K has been applied to study the lattice location and properties of Fe in three types of single crystal garnet structures: yttrium iron garnet $\text{Y}_3\text{Fe}_5\text{O}_{12}$ (YIG), gadolinium gallium garnet $\text{Gd}_3\text{Ga}_5\text{O}_{12}$ (GGG) and yttrium aluminium garnet (YAG, $\text{Y}_3\text{Al}_5\text{O}_{12}$). The results show that introducing point defects by ion implantation is a possible method of tailoring magnetic properties in the ferromagnetic garnet system.

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