Magnetic properties of $\text{Mn}_{1-x}\text{Gd}_x\text{Se}$ solid solutions

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The synthesis of polycrystalline $\text{Mn}_{1-x}\text{Gd}_x\text{Se}$ solid solutions is carried out by solid-state reaction method followed by quenching from the temperature of 1370 K. The X-ray diffraction studies realized at 300 K revealed that the structure of the single-phase samples in the $0 \leq x \leq 0.15$ concentration range is identified on base a face-centered cubic crystal cell of Fm3m space group. The heating of the solid solutions to $\sim 900\text{K}$ does not affect on the magnetic susceptibility as the dependence is identical to the measurements in the "heating-cooling" regime. Comparing the research results of magnetic properties of the $\text{Mn}_{1-x}\text{Gd}_x\text{Se}$ solid solutions with those of $\text{Mn}_{1-x}\text{Gd}_x\text{S}$ and $\text{Mn}_{1-x}\text{Yb}_x\text{S}$ [1,2] solid solutions, we can conclude that substitution of manganese ions by gadolinium in manganese selenide lead to smaller changes in the basic magnetic characteristics than in manganese sulfide.

References: