Magnetic properties of $NdMn_{2-x}Fe_xGe_2$ (x=0.3, 0.4 and 1.0) compounds.

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9.7 cm

Magnetic properties of the $NdMn_{2-x}Fe_xGe_2$ (x=0.3, 0.4 and 1.0) are investigated by AC magnetic measurements and neutron diffraction. In ambient pressure in compound with x=0.3 below 200 K the noncollinear magnetic structure is observed. Above this temperature the magnetic moments transform to the collinear one. For x=0.4 at T=1.5 K the Nd magnetic moments form collinear ferromagnetic structure, while Mn moments noncollinear. With increase of the temperature at T=50 K Nd moment disappears while Mn moments form four different magnetic structures antiferro- (AF) and ferromagnetic (F). The change between AF and F phases is connected with the change of the lattice constants. For x=1.0 the Mn moments form collinear antiferromagnetic structure stable in the temperature range between 1.5 K and T_N=203 K. For x=0.3 the external pressure up to 1.5 GPa causes the change of the critical temperature only, while for x=0.4 induces the change of the magnetic properties from ferro- to antiferromagnetic. For x=1.0 the Néel temperature increase with increasing external pressure. The above results indicate that in the $NdMn_{2-x}Fe_xGe_2$ system, the increase in the iron content is followed by a change in chemical bond that influences the magnetic properties.

13.4 cm

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