Properties of GdFeAl ternary compound

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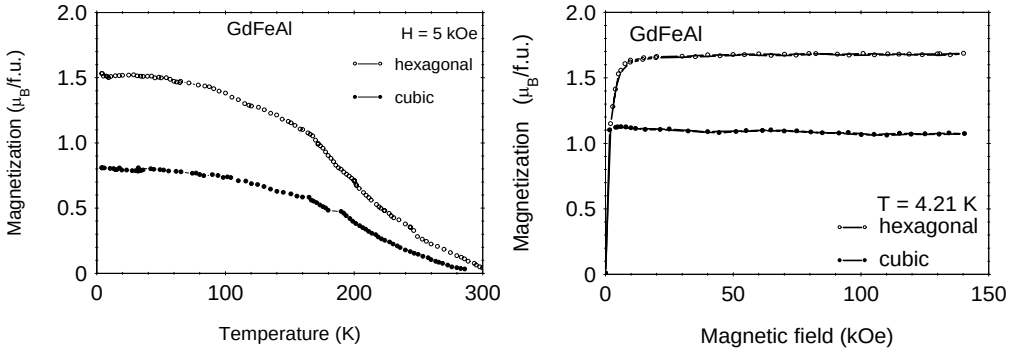
The intermetallic ternary compounds of the RTX type, consisting of the rare earth R, transition metal T and the *p* element X exhibit an enormously rich variety of crystallographic structures and magnetic properties. Some of these compounds could exist in various crystallographic structures. The well known example is GdPdAl (TiNiSi or ZrNiAl) [1].

Recently, magnetic and magnetocaloric properties of GdFeSi were investigated as a part of research concerning the development of new materials for magnetic refrigeration devices [2]. Due to the lack of information relevant to the intermetallic compound GdFeAl



complete researches were performed. Properties of the GdFeAl compound which crystallized in the cubic $MgCu_2$-type structure as well as in hexagonal $MgZn_2$-type structure were compared. The electrical resistivity, ac-susceptibility and magnetization as a function of temperature revealed relatively high magnetic ordering temperature. The thermal broadening of the ESR resonance linewidths suggests presence of a weak bottleneck effect, despite the fact that Fe *3d* band is not completely filled and Fe ions are coupled to the lattice. The significant differences both in relaxation rates and in magnetization were observed for samples with different crystallographic structures. The XPS investigation showed that *3d* peak is situated very close to the Fermi level and the density of states at the Fermi level.

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