

MAGNETIC, ELECTRIC PROPERTIES AND ELECTRONIC STRUCTURE OF $\text{GdNi}_{3-x}\text{Fe}_x$

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We report results of measurements of the magnetic susceptibility, the electrical resistivity, the crystal and electronic structure of the polycrystalline intermetallic $\text{GdNi}_{3-x}\text{Fe}_x$ compounds. The partial substitution Ni by Fe is reflected in the linear increase of the lattice parameters in the whole range of x . The Curie temperature depends on Fe concentration. The value of T_C increases at first, reaches a maximum around $x=0.4$ and then decreases. For higher concentration of Fe we have observed the compensation temperature T_{comp} . The changes in the magnetic properties are interpreted in correlation with the electronic structure of the investigated system, which have been studied by using X-ray Photoelectron Spectroscopy (XPS). The valence band spectra at the Fermi level (E_F) exhibit the domination of the hybridized Ni/Fe ($3d$) and Gd ($5d$) states. We have observed a remarkable decrease of the density of states near E_F and the shift of $4f$ Gd peaks in the energy scale for the Fe-rich compounds.

13.4 cm

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9.7 cm