

Abstract

This thesis studies the $\text{UCo}_{1-x}\text{Ru}_x\text{Ge}$ system on the border of magnetic instability. Proper study of magnetic and transport properties of poly crystals with different ruthenium content revealed complex change of these parameters through the series. UCoGe is a weak ferromagnet with $T_C \sim 3\text{K}$ and low magnetic moment $0.035\mu_B/\text{f.u.}$. We observed rapid increase of these two quantities up to the concentration of ruthenium of $x_{\text{max}} \approx 0.1$. Background of this increase was studied on the single crystal grown by floating zone method. Polarized neutron diffraction experiment performed on this single crystal with composition of $\text{UCo}_{0.88}\text{Ru}_{0.12}\text{Ge}$ explained strengthening of magnetism with a change of mutual orientation of magnetic moments on the uranium and cobalt site. Previously reported antiparallel alignment for the UCoGe is changed to the parallel orientation for the doped $\text{UCo}_{0.88}\text{Ru}_{0.12}\text{Ge}$ when cobalt moment is reoriented. Strong anisotropy of the $\text{UCo}_{0.88}\text{Ru}_{0.12}\text{Ge}$ projects to the temperature dependence of resistivity and to the thermal expansion properties. This primal increase of T_C and magnetic moment is followed by decrease when approaching the concentration $x_{\text{cr}} \approx 0.31$ where magnetic order disappears. Closer study of the critical exponents of temperature dependencies of resistivity, specific heat and the concentration dependency of the T_C are pointing on the presence of Non-Fermi liquid behavior possibly indicating the vicinity of the Quantum Critical Point.