Magnetic and magnetotransport properties of U(Rh,Ru)Ge system

W. Miiller and V.H. Tran

W. Trzebiatowski Institute of Low Temperature and Structure Research
Polish Academy of Sciences, Okólna 2, 50-422 Wrocław, Poland

Recently, the magnetic phase diagram of $URh_{1-x}Ru_xGe$ has been reported by Sakarya *et al*. [1] and Miiller and Tran [2]. The first authors have shown that the substitution of Rh by Ru suppresses ferromagnetic order for a concentration of about 0.38, whereas the latter ones have demonstrated that there is possible non Fermi-liquid behaviour in this alloy. The present contribution reports on the measurements of magnetization and magnetoresistance (MR) $\Delta\rho/\rho_0$ ($\mu_0 H$, T) of $URh_{1-x}Ru_xGe$. The experiments were carried out in the temperature range 2-100 K and in magnetic fields up to 8 T. Previously, the parent URhGe compound was shown to have a large magnetoresistance of $\Delta\rho/\rho_0$=-36% at 8 T and 9 K [3]. We will show that the absolute value of magnetoresistance in ferromagnetic alloys (x=0-0.35) at T_C decreases with increasing Ru content. However, for x=0.38 $\Delta\rho/\rho_0$ becomes positive at 8 T. For an illustration, we display the field dependence of MR for the compositions with x=0.1 (Fig. 1) and x=0.38 (Fig. 2). For the latter alloy, for which the magnetization and electrical resistivity measurements indicate NFL features, the MR(H) behaviour seems to be complex. At low temperatures and magnetic fields one recognizes a negative MR minimum. A possible explanation of this phenomenon is due to the existence of two magnetoresistance contributions: a negative originating from ferromagnetic correlations and positive one from the ordinary magnetoresistivity and/or antiferromagnetic correlations.

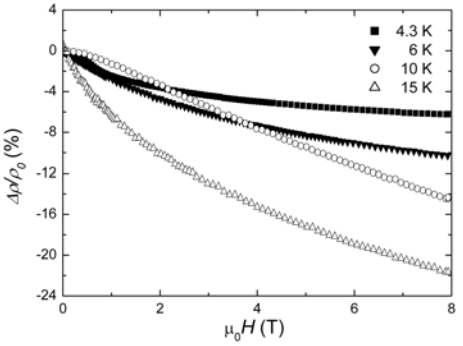

Fig 1. MR of $URh_{0.1}Ru_{0.9}Ge$ at selected temperatures.

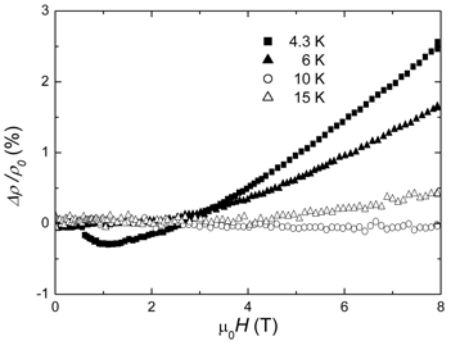

Fig 2. MR of $URh_{0.62}Ru_{0.38}Ge$ at selected temperatures.

[1] S. Sakarya *et al.*, in Proc. of Intern. Conf. on SCES, Vienna, July 26-30, 2005.
[2] W. Miiller and V. H. Tran, in Proc. of 36emees Journées des Actinides, Oxford, England, 1-4 April, 2006.
[3] V.H. Tran and R. Troć, Phys. Rev. B **57** (1998) 11592.

Name of the presenting author (poster): Wojciech Miiller
e-mail address: W.Miiller@int.pan.wroc.pl
url's: http://www.int.pan.wroc.pl/zbm/zespol.htm