Hall effect in pseudoternary $URu_{1-x}Pd_xGe$ intermetallics

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Pseudoternary $URu_{1-x}Pd_xGe$ intermetallics, crystallizing in the TiNiSi-type orthorhombic structure, have been reported to exhibit rich magnetic phase diagram, including the possibility of an Antiferromagnetic (AF) Quantum Critical Point (QCP) at the critical concentration $x_{cr} = 0.32$, AF ordering in the concentration range 0.4 - 0.8 and complex magnetic structures for $x \geqslant 0.85$ [1]. To gain better insight into the evolution of magnetic properties in the system, we investigated the Hall effect. The experiments reveal that Hall coefficient R_H of all studied alloys is positive over the whole measured temperature range. Interestingly, R_H of $x_{cr} = 0.32$ does not saturate at low temperatures. In contrast, $R_H(T)$ of $x > 0.4$ displays a maximum around their magnetic transition temperature. We show that the $R_H(T)$ data can be interpreted as the sum of ordinary R_0 and extraordinary R_s contribution. We found that effective mass estimated from R_0 increases sharply as the system approaches x_{cr}, and retains a value of approaximately 100 m_e at x_{cr}. Our finding provides new support to the development of heavy fermion state nearby AF-QCP in $URu_{1-x}Pd_xGe$.

References:

[1] D. Gralak, V. H. Tran, J. Solid State Chem. 226, 50 (2015).

Financial support from the project 2011/01/B/ST3/04553 NSC of Poland.