9.7 cm

ANOMALOUS TRANSPORT AND THERMAL PROPERTIES OF THE SOLID SOLUTIONS $U_{1-x}Th_xCu_5M$ (M = Al, Ga, In and Sn)

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UCu_5M-type compounds are moderate heavy fermion systems with an antiferromagnetic order below T_N = 18 and 24 K for M = Al and In, respectively, and a ferrimagnetic order with T_C = 54 K for M = Sn. We present the results of magnetoresistance (MR) measurements as a function of temperature and applied magnetic field for the three compounds and for their solid solutions containing Th, i.e. $U_{1-x}Th_xCu_5M$. Only in the case of UCu_5In and its Th substituted alloys a substantial positive contribution to the MR was observed at low temperatures, as for normal antiferromagnets. For the Al- and Sn-based alloys the MR at low temperatures is negative, and its field variation proves the existence of Kondo-type interactions. On Th-substitution the magnetic phase transition is shifted to lower temperature and simultaneuosly the MR becomes less negative. The field dependence of the MR of these alloys can be well described by the Coqblin-Schrieffer model. Interestingly, the heat capacity measurements have revealed a general tendency to increase the linear coefficient γ with magnetic dilution of a given UCu_5M compound by Th-substitution. This feature reflects an enlargement of the effective mass of conduction electrons with increase in the unit cell volume.

13.4 cm

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