9.7 cm

EVIDENCE FOR A MAGNETO-GALVANIC MECHANISM IN ANISOTROPY OF RESISTIVITY IN U_3P_4 AND U_3As_4

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U_3X_4-type compounds (X = P, As, Sb, Bi) are iso-structural (b.c.c.), multi-sublattice ferromagnets showing spectacular variety of magnetic and electronic properties due to the interplay of f-electron hybridization, crystal-field symmetry and magnetic interactions (m_{eff} up to $\approx 70m_0$, $\Delta\rho/\rho$ up to 30%). Here we show how the angular dependence of thermoelectric power measured in low magnetic field can prove the role of magneto-galvanic effect in the anisotropy of their electrical resistivity.

In both compounds resistivity displays very strong ferromagnetic anisotropy. Its value depends on angle between electric current and direction of magnetic moment in the sample. Moreover, for the magnetic field directed along [100]- or [110]-axes, sharp peaks of electric resistivity are observed. Our measurements of angular dependence of thermoelectric power show that the ferromagnetic anisotropy persists, whereas, the peaks at [100] and [110] do not appear. It proves that these peaks of the resistivity are of magneto-galvanic origin, being due to the electric current. We explain how these peaks may appear because of high Hall coefficient and domain structure of the samples.

13.4 cm

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