A huge magnetoresistivity in UPdGe at the ferro-antiferromagnetic transition

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The recent work concerning the 1:1:1 phases focuses mainly on our novel MR measurements performed on a polycrystalline sample of UPdGe [1]. It crystallizes in the orthorhombic TiNiSi-type structure, like the URhM (M=Si, Ge) ternaries. This structure can be characterized as having zigzag chains of uranium atoms propagating along the a-axis. UPdGe was reported to undergo two magnetic transitions at low temperatures [2]. Below about T_C= 30 K it becomes a simple ferromagnet, while at higher temperatures up to 50 K it is identified as being an antiferromagnetic longitudinal spin-density wave with q = (0,0,0.33) with a magnetic moment amplitude μ_A of about 1 μ_B [3, 4].The magnetization taken along the *a* and *c*–axes exhibits a metamagnetic transition (MTM) at the same critical field B_M of around 2 T at 40 K, whereas along the *b*-axis B_M is about one tesla higher [5].

In Fig.1 the electrical resistivity data taken at zero and 8 T as well as the magnetoresistivity MR defined as the ratio $\Delta\rho/\rho = [\rho(B) - \rho(0)/\rho(0)]$ for B=8 T are plotted against log T [1]. One can see a very sharp negative minimum peaking exactly at T_C = 30 K, where $\Delta\rho/\rho$ reaches as huge value of MR as –73%.This value is comparable to those found earlier for another 1:1:1 equiatomic compounds, like UNiGa, UNiGe and UPdIn, exhibiting metamagnetic transitions. A comparison of the isofield data taken at a fixed 8 T with those isotherms collected at selected temperatures between 4.2 – 100 K reveals that there is a good agreement between them. This underlies a reliability of obtained here the MR results.

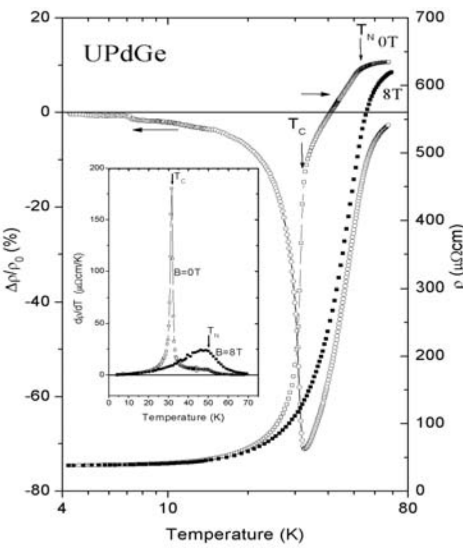

Fig. 1. Magnetoresistivity at zero and 8 T versus logT. Inset: the temperature derivative *dρ/dT.*

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[2] R. Troć and V.H.Tran, J. Magn. Magn. Mater. **73** (1988) 389.
[3] S. Kawamata *et al.,* J. Magn. Magn. Mater. **104-107** (1992) 51.
[4] S. Kawamata *et al.,* J. Magn. Magn. Mater. **104-107** (1992) 53.

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