Strongly correlated electron behaviour in CeT_2Al_8 (T =Fe, Co)

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9.7 cm

In the exploratory work of Koterlin *et al.* [1] anomalous behaviour in electronic and thermal transport in the ternary rare-earth aluminides CeT_2Al_8 were reported. They form in an orthorhombic crystal structure. Ce is located inside a cage comprising 20 nearest-neighbour atoms. With 44 atoms per unit cell the compounds may be classified as complex metal alloys. Here we present results of electronic and magnetic studies of the two title compounds in continuation of our investigations into competing magnetic interactions in strongly correlated electron systems. According to Mössbauer studies [2] Fe in this system does not have a magnetic moment and hence magnetic phenomena originate in essence from the Ce^{3+} ion. No magnetic ordering is detected down to 2 K in either compound. The temperature dependence of electrical resistivity $\rho(T)$ of $CeFe_2Al_8$ is reminiscent of intermediate valence. This is echoed by a strong moment suppression at ~ 100 K in the magnetic susceptibility $\chi(T)$ and a considerably reduced effective moment compared to that of free Ce^{3+}. The specific heat $C_P(T)/T$ as well as $\rho(T)$ of $CeFe_2Al_8$ shows Fermi-liquid behaviour, whereas $\rho(T)$ of $CeCo_2Al_8$ reveals a Kondo exchange interaction. A non-Fermi-liquid behaviour with strong enhancement in $C_P(T)/T$ sets the ground state of $CeCo_2Al_8$ clearly apart from that of the Fe-derivative, and points to the delicately balanced magnetic interactions in these compounds.

1. M. D. Koterlin *et al.*, Sov. Phys. Solid State **31** (1989) 1826

2. I. Tamura *et al.*, J. Magn. Magn. Mater. **220** (2000) 31

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