9.7 cm

FERROMAGNETIC ORDERING IN $UFe_{0.5}Ni_{0.5}Al$

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The solid solutions between non-magnetic UFeAl and antiferromagnetic UNiAl quite unexpectedly yield ferromagnetic properties of the $UFe_{1-x}Ni_xAl$ alloys around x = 0.5 [Troć *et al.* PRB 51 (1995) 3003]. In this work we investigate the nature of magnetic ordering of $UFe_{0.5}Ni_{0.5}Al$ by means of neutron powder diffraction and specific heat measurements. The investigated alloy crystallizes in the hexagonal Fe_2P-type structure, and the transition a ferromagnetic state occurs at $T_C = 55$ K, as previously reported. The magnetic structure consists of the ferromagnetic (001)-planes with the magnetic moments parallel to the c-axis. At 1.5 K, the ordered uranium moment (μ_{ord}) is about 0.6 μ_B. Surprisingly, no clear λ-type anomaly in the specific heat (C_p) is observed at T_C. The temperature dependence of C_p may be described by an expression involving an energy gap in the magnon spectrum. The electronic coefficient of the specific heat is modestly enhanced and amounts to about 47 mJ/mole-U K^2. This feature together with a small value of μ_{ord} point to the strongly hybridized character of the 5f-d magnetism in $UFe_{0.5}Ni_{0.5}Al$.

13.4 cm

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1. Correlated Electrons and High Temperature Superconductors

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