NON-FERMI LIQUID GROUND STATE IN CeRhSn: EFFECT OF GRAIN BOUNDARY DEFECTS ON THE ELECTRIC TRANSPORT BEHAVIOR

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The compound CeRhSn exhibits a non-Fermi liquid (NFL) character of the temperature dependence for low-temperature physical properties. The susceptibility χ and specific heat C divided by temperature, C/T, can be fitted to T^{-n} behavior with the value of the power-law exponent $n \cong 0.5$ suggesting that the NFL behavior can be described by the Griffiths-McCoy model. The resistivity is indeed NFL in character (i.e., $\rho \sim T^{\epsilon}$), however, the power-law that should extend over several decades in temperature is dependent on the T-range ($\epsilon \cong 1$ down to ~ 3 K, while $\rho \sim T^{1.7}$ for $0.1 < T < 3$ K). Measurements by an atomic force microscopy show the nanometre-sized grains consisting of the crystalline components separated by the grain boundary/interface, which are strongly inhomogeneous and off-stoichiometry. We argue that there is possible a ballistic transport of electrons through an interface which strongly modifies the $\rho(T)$ dependence of the polycrystalline CeRhSn sample.

9.7 cm

13.4 cm

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