



Effects of electronic correlation in CeRuAl compound

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Abstract

Pioneering of condensed matter physics relates to various factors of electronic correlations. Exploring new materials, always achieve important roles to develop the understanding of magnetism in correlated matter. Rare-earth-based compounds especially Cerium-based inter-metallics display different types of interesting properties and the reason behind these fascinating properties is the strongly correlated nature of these materials. In broadening our level of understanding on correlated materials especially on low temperatures, we aim to set a report on the compound of CeRuAl. Physical properties (magnetic, transport and electronic) of CeRuAl are measured for the temperature ranges 400 K to 0.5 K and in the magnetic field up to 7 T. It is observed that the Sommerfeld coefficient, which is calculated from the measurements of heat capacity, has the value of $\gamma = 62 \text{ mJ/mol K}^2$. At temperature 1.1 K, this compound CeRuAl shows mixed valent behavior. At the lower temperature range (0.9 K to 0.4 K) with applied field up to 0.5 T, the superconductivity property is evident. Absence of quick rise in low-temperature resistivity indicates that the gap formation in the electronic density of states does not exist.