



## Electronic correlation effects in $Ce_4RuMg$ compound

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### Abstract

Different factors of electronic correlations directly relate with the fundamentals of condensed matter physics. Exploration of novel materials has an important character in developing the level of understanding of magnetic properties in correlated matters. It is known to all scientists that Cerium-based compounds exhibit different thought-provoking properties which relate with the correlated nature of intermetallics materials. To improve the knowledge of correlated systems especially at very low temperatures, we prepare a statement on  $Ce_4RuMg$  material. Different physical properties of the compound  $Ce_4RuMg$  have been measured within a range above room temperature to very low temperature which is about 0.5 K with the application of 7 T applied magnetic field. It is observed that the type of crystallization is cubic  $Gd_4RhIn$  type structure and the space group is  $F43m$ . An incongruity is perceived at 1.5 K from the magnetic susceptibility graph, a suggestion of the antiferromagnetic phase of that compound. The observed moment of magnetization is  $\mu_{eff} = 2.17 \mu_B/Ce$  which is very close to pure Ce metal ( $\mu_{eff} = 2.54 \mu_B$ ). This might be associated with the (CEF) effects considering magnetocrystalline anisotropy. The zero magnetic field specific heat measurement exhibits an anomaly at 1.8 K which is possibly owing to the presence of long-range magnetic interactions in  $Ce_4RuMg$ . The value of electronic specific heat coefficient  $\gamma = 137 \text{ mJ/Ce-mol K}^2$ , calculated from the heat capacity measurements, parades the tendency of a heavy fermion-like behavior.