Contribution ID: **410** Type: **Poster Presentation**

Magnetic and thermodynamic properties of Ce23Ru7Mg4 compound

Wednesday, 9 July 2014 17:10 (1h 50m)

Abstract content
   (Max 300 words)
Formatting &
Special chars

Complex metal alloys have been shown to offer new possibilities in developing high efficiency thermoelectric material [1]. Among the correlated electron class of magnetic systems, the enhanced thermoelectric power characteristic of Kondo metals offers a distinct advantage in gaining thermoelectric efficiency. Here we present exploratory results of a study on the novel compound Ce23Ru7Mg4 which has 68 atoms per unit cell and therefore qualifies as a complex metal alloy.
The magnetic susceptibility and heat capacity for Ce23Ru7Mg4 compound have been studied above room temperature to low temperature range and in the applied magnetic field up to 7 T. This compound crystallizes with the hexagonal non-centrosymmetric Pr23Ir7Mg4-type structure, with space group P63mc [2]. The structure is built up from complex three dimensional networks of edge and corner-sharing RE6Ru trigonal prisms. The magnetic susceptibility and specific heat both exhibit a distinct anomaly at ˜2 K which most probably suggests a paramagnetic to antiferromagnetic phase transition. The magnetic susceptibility revealed a magnetic moment μeff = 2.235 μB/Ce which is close to the value for cerium in pure Ce metal (μeff = 2.54 μB), indicating a presence of well localized magnetic moments carried by the stable Ce3+ ions. The magnitude of the electronic specific heat coefficient γ = 127 mJ/Ce-mol K2 suggests correlated electron behavior in this compound.
[1] S. Paschen, C. Godart and Y. Grin in Complex metallic alloys: fundamentals and applications, Jean-Marie Dubois; Esther Belin-Ferré (eds.), Weinheim: Wiley-VCH Verlag, 2011.

[2] S. Linsinger, M. Eul, W. Hermes, R-D. Hoffmann and R. Pöttgen, Z. Naturforsch 64b (2009) 1345.

Apply to be
 considered for a student
   award (Yes / No)?

No

Level for award
 (Hons, MSc,
   PhD)?

N/A

Would you like to <br> submit a short paper <br> for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Dr DEBNATH, Jyotish Chandra (University of Johannesburg)

Co-authors: Prof. STRYDOM, A.M (University of Johannesburg); Prof. PÖTTGEN, R (Universität Münster)

Presenter: Dr DEBNATH, Jyotish Chandra (University of Johannesburg)

Session Classification: Poster2

Track Classification: Track A - Division for Physics of Condensed Matter and Materials