Contribution ID: **327** Type: **Oral Presentation**

Magnetic and physical properties of new hexagonal PrPt₄X (X = Ag, Au) compounds

Wednesday, 27 June 2018 16:40 (20 minutes)

We have synthesized PrPt₄Ag and PrPt₄Au compounds for the first time and report their crystal structure, as well as magnetic and physical properties in the temperature range between 2 K and 300 K. Both compounds are derived from the substitution of Pt with Ag and Au respectively in the parent compound PrPt₅ which crystallizes in the hexagonal CaCu₅-type structure [1, 2]. Here, we observed the preservation of the hexagonal CaCu₅-type structure under such substitutions which is in contrast to the observations in PrCu₄Ag and PrCu₄Au [3, 4] adopting the cubic MgCu₄Sn-type structure upon substitution on parent hexagonal PrCu₅. The temperature dependence of specific heat, C_p(T) and electrical resistivity, &rho(T) of PrPt₄Ag show an anomaly at 7.6 K but which is absent in the magnetic susceptibility, &chi(T) and thus suggesting a possible multipolar ordering of the Pr³⁺ magnetic moment. PrPt₄Au on the other hand does not show any anomaly but an upturn in C_p(T)/T below about 10 K and reaching a value of 1.23 J/(K²mol) at 2 K. In addition, &rho(T) ~ T and &chi(T) ~ T^{-1/3} for nearly a decade in temperature. These observations in PrPt₄Au are the hallmark of a non-Fermi liquid (nFL) behavior and is characteristic of a system with a low lying order parameter. The analysis of the low temperature C_p(T) for PrPt₄Ag and PrPt₄Au give values of the Sommerfeld coefficient, &gamma = 728.5 mJ/(K²mol) and 509.1 mJ/(K²mol) respectively indicating a significant enhancement of the quasiparticle mass in the two compounds.

Please confirm that you
have carefully read the
abstract submission instructions
under the menu item
”Call for Abstracts”
(Yes / No)

Yes

Consideration for
student awards
Choose one option
from those below.
N/A
Hons
MSc
PhD

PhD

Supervisor details
If not a student, type N/A.
Student abstract submision
requires supervisor permission:
please give their name,
institution and email address.

Prof. AM Strydom, University of Johannesburg, amstrydom@uj.ac.za

Primary authors: Prof. STRYDOM, Andre (University of Johannesburg); Mr OGUNBUNMI, Michael (University of Johannesburg)

Presenter: Mr OGUNBUNMI, Michael (University of Johannesburg)

Session Classification: Physics of Condensed Matter and Materials

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