Contribution ID: **250** Type: **Poster Presentation**

Kondo and crystal - eletcric field effects andMagnetic behaviour in Ce8Pd24(Al1−xSnx)

Tuesday, 4 July 2017 17:10 (1h 50m)

The compounds Ce8Pd24(Al1−xSnx), (0 < x <1) have been studied by means of electrical resistivity, &Rho(T), thermoelectric power,
S(T), thermal conductivity, &lambda(T), magnetic susceptibility, &Chi(T) and magnetization, M(&mu0H) measurements. All investigated
compositions crystallize in a cubic AuCu3 - type crystal structure with space group Pm3m (No. 221). &Rho(T) data is dominated by
both coherent Kondo lattice scattering and crystal-electric field effect (CEF) for alloys in the concentration range 0 < x < 0.7
and by only CEF effect for alloys with x< 0.8. At low temperature &Chi(T) data indicate a steep decrease at TN associated with
antiferromagnetic (AFM) phase transition for all compositions. Below TN, &Chi(T) is described by a spin - wave dispersion relation with
an energy gap &delta. The high temperature S(T) data is described by the phenomenological resonance model giving the characteristic
temperature TCEF associated with CEF effect. &lambda(T)(T) increase linearly with temperatures from low T. The reduced Lorentz number,
L/L0 increase upon cooling and exhibit maxima which decrease in magnitude with increasing x. &Chi(T) data at high temperature
for all compositions follows the paramagnetic Curie - Weiss relation with negative Weiss temperatures constant &theta p and effective
magnetic moments μeff close to the value of 2.54 μB expected for the free Ce3+ - ion. The low temperature dc &Chi(T)(T) data indicate
an AFM anomaly for all compositions, associated with a N´eel temperature ranging from TN = 4.3 K to 7 K between the two
end compounds also observed in the $Rho(T) results. Field - cooling (FC) and zero - field - cooling (ZFC) &Chi(T)(T) data indicates spin -
glass behaviour at Al concentrated alloys. M(&mu0H) data increase linearly with field up to 5 T, with no evidence of metamagnetic
transition and hysteresis loop.

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yes

Level for award
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PhD

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Yes

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Session Classification: Poster Session 1

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