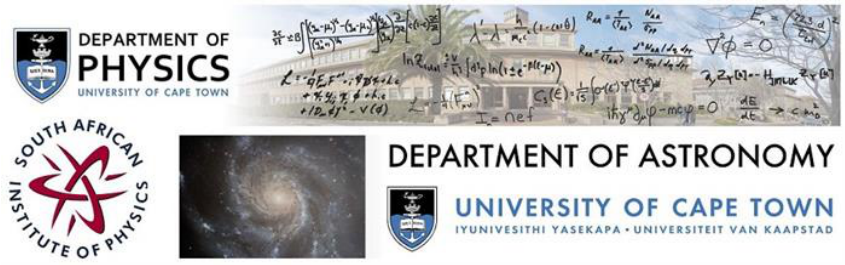

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Magnetic and Kondo behaviour in Ce8Pd24(Al1-xSnx)

Tuesday, 5 July 2016 16:10 (1h 50m)

Abstract content
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Ce8Pd24(Al1−xSnx), (0≤ x ≤ 1) has been studied by magnetic susceptibility, ⊠(T), magnetization, M(μ0H), electrical resistivity, ρ(T), thermoelectric power, S(T), and thermal conductivity, λ(T), measurements. All investigated compositions crystallize in a cubic AuCu3 − type crystal structure with space group Pm−3m (No. 221). ⊠(T) data at high temperature follows the paramagnetic Curie − Weiss relation with negative Weiss temperatures θp and effective magnetic moments μeff close to the value of 2.54 μB expected for the free Ce3+ - ion. The low temperature dc ⊠(T) data indicate an antiferromagnetic (AFM) anomaly for all compositions between 0 ≤ x ≤ 1, associated with a Néel temperature ranging from TN = 4.3 K to 6.9 K between the two end compounds. Field − cooling (FC) and zero − field − cooling (ZFC) ⊠(T) data indicates spin − glass behaviour at Al concentrated alloys. ρ(T) data is dominated by coherent Kondo lattice scattering for alloys in the concentration range 0 ≤ x ≤ 0.5 and by crystal −electric field (CEF) effect for alloys with x ≥ 0.7. At low temperature ρ(T) data indicate a steep decrease at TN associated with magnetic phase transition also observed in the ⊠(T) results. Below TN, ρ(T) is described by a spin − wave dispersion relation. At low temperatures, S(T) data measurements indicate an AFM transition at TN corresponding to the ⊠(T) and ρ(T) results. The high temperature S(T) data is described by the phenomenological resonance model giving the Kondo temperature TK and the characteristic temperature TCEF associated with crystal - electric field effect. λ(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 increase x, while the figure of merit (ZT=S2T/ρ) exhibit maxima and minima upon cooling and the magnitude at room temperature decreases with x.

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