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MOLECULAR MAGNETISM AND CRYSTAL FIELD EFFECTS IN THE KONDO SYSTEM $Ce_3Pd_{20}(Si,Ge)_6$ WITH TWO Ce SUBLATTICES

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The Kondo systems $Ce_3Pd_{20}T_6$ (T = Ge, Si) with two characteristic temperatures Kondo demonstrates unusual magnetic and transport properties first discussed in [1]. The feature of this cubic system is two nested cubes composed of cerium ions, Ce1 and Ce2, in two non-equivalent positions. These systems demonstrate high electron heat capacity: estimations above $T = 6$ K give the value of γ=0.3 and 0.21 J/ mol K^2 for T = Si and Ge. $Ce_3Pd_{20}Si_6$ has at ultralow temperatures T = 0.3÷2 K anomalous heat capacity which is almost constant, and formally calculated γ grows up to 10^4 J/mol K^2.

The logarithmic growth of resistance for both systems (Fig.1) confirms the presence of the Kondo effect in the two respective temperature ranges. The two-scale behavior is explained by consecutive splitting of Ce ion levels in the crystal field [2]. The calculation of the crystal field parameters is performed basing on experimental data on magnetic susceptibility. The effects of the frustration caused by the coexistence of the different positions of cerium may also significantly enhance the observed values of specific heat. Replacing of Ce by U and Sm leads to dramatic disappearance of anomalies discussed.

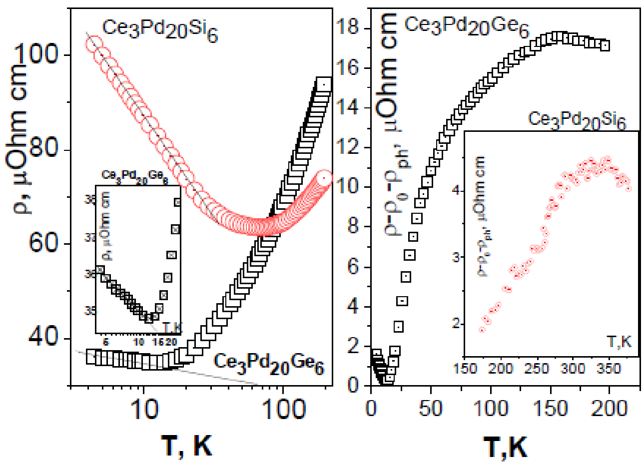

Fig.1.Temperature dependences of resistivity al low temperature (left) and at more high temperatures (right; phonon contribution is subtracted)

[1] V.N. Nikiforov et al, *Int. Conf. on Solid Compound of Transition Elements, Wroclav*, 1994, pp.79-90; Yu P. Gajdukov et al, *JETP Letters*, **61**, 391 (1995).
[2] S. Kashiba et al, *J. Phys. Soc. Jpn* **55**; 1341 (1986).