9.7 cm

Kondo effect in the presence of crystal–field in Ce–Ni–Ge compounds

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Polycrystalline samples of $CeNiGe_3$, $Ce_2Ni_3Ge_5$, Ce_3NiGe_2, $Ce_3Ni_2Ge_7$ and their non-magnetic La- or Y-based analogues were studied by means of electrical resistivity measurements. The temperature dependencies of the electrical resistivity of $YNiGe_3$, $La_2Ni_3Ge_5$, La_3NiGe_2 and $La_3Ni_2Ge_7$ are typical for simple intermetallics. The Bloch-Grüneisen description of the phonon contributions yielded for these compounds the Debye temperatures of 208, 312, 123 and 257 K, respectively. In turn, the magnetic contributions ρ_{mag} to the resistivity of the Ce-based phases reveal in the paramagnetic region logarithmic slopes and humps in $\rho_{mag}(T)$, characteristic of Kondo systems with strong crystal–field interactions, as predicted by the Cornut–Coqblin theory. The total crystal–field splitting of the six-fold degenerated ground multiplet $^2F_{5/2}$ of Ce^{3+} ions were estimated to be of the order of 100–200 K. In the magnetically ordered region the resistivity strongly decreases showing at the lowest temperatures a behavior typical for electron–magnon scattering. The presented resistivity data are discussed in connection with the magnetic and thermal properties of the compounds studied.

13.4 cm

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