Novel ferromagnetic Kondo lattices Ce_3RhSi_3 and Ce_3IrSi_3

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The physical properties of two novel Ce-based intermetallics Ce_3RhSi_3 and Ce_3IrSi_3 have been studied by means of magnetization, electrical resistivity and heat capacity measurements, performed down to 350 mK in magnetic fields up to 9 T. The compounds crystallize with an orthorhombic structure of the Y_3NiSi_3 type (space group *Immm*) that can be considered as a combination of AlB_2- and W-type units. There are two inequivalent sites for Ce atoms in the unit cell and both are occupied by trivalent ions, as inferred from a Curie-Weiss analysis of the magnetic susceptibility. The magnetic and electrical transport data distinctly manifest Kondo interactions with the characteristic temperature scale of about 6-10 K. Nevertheless, the two compounds order *ferromagnetically* at low temperatures, namely at $T_C = 4.4$ K for Ce_3RhSi_3 and $T_C = 10.5$ K for Ce_3IrSi_3. Moreover, the latter silicide undergoes a ferromagnetic-like order-order transition at $T_t = 3$ K. In the ordered state, the electrical resistivity and the specific heat of both ternaries are governed by ferromagnetic spin-waves contribution. In turn, their low-temperature specific heat shows a large enhancement [$C/T = 700$ and 460 mJ/(mol K^2) for the Rh- and Ir-containing phase, respectively], thus implying the formation of heavy-electron ground states.