Rare Earth-rich Cadmium Compounds $RE_{23}T_7Cd_4$ (T = Co, Ni, Ru, Rh, Ir, Pt)

Frank Tappe and Rainer Pöttgen

Institut für Anorganische und Analytische Chemie, Universität Münster, Corrensstraße 30, D-48149 Münster, Germany

Reprint requests to R. Pöttgen. E-mail: pottgen@uni-muenster.de

Z. Naturforsch. **2009**, *64b,* 184 – 188; received November 11, 2008

The rare earth-rich intermetallic compounds $RE_{23}T_7Cd_4$ (RE = La–Nd, Sm, Gd, Tb; T = Co, Ni, Ru, Rh, Ir, Pt) were synthesized by melting of the elements in sealed tantalum tubes in a high-frequency furnace. They crystallize with the $Pr_{23}Ir_7Mg_4$-type structure, space group $P6_3mc$, Z = 2. The structures of $La_{23}Pt_7Cd_4$ (a = 1025.4(2), c = 2319.5(5) pm, $wR2$ = 0.0425, 2587 F^2, 74 variables), $La_{23}Ru_{6.87(1)}Cd_4$ (a = 1015.0(2), c = 2282.8(4) pm, $wR2$ = 0.0383, 2459 F^2, 75 variables), and $Nd_{23}Rh_7Cd_4$ (a = 990.0(2), c = 2239.0(5) pm, $wR2$ = 0.0507, 2350 F^2, 74 variables) were refined from single crystal X-ray diffractometer data. Central structural motifs of the $RE_{23}T_7Cd_4$ compounds are transition metal-centered trigonal prisms of rare earth atoms and Cd_4 tetrahedra. The RE_6T prisms are condensed *via* common edges and corners, leading to three-dimensional networks. Typical interatomic distances in the prismatic network and in the Cd_4 tetrahedra are 295 – 313 pm La–Pt and 319 – 325 pm Cd–Cd, respectively (examplarily for $La_{23}Pt_7Cd_4$).

Key words: Intermetallics, Cadmium, Crystal Chemistry