Solid State Syntheses and Structure of LaPdCd₂ and PrNi_{0.951(4)}Cd₂

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The intermetallic cadmium compounds LaPdCd₂ and PrNi_{0.951(4)}Cd₂ were synthesized from the elements in sealed tantalum tubes in an induction furnace. Both phases were investigated by X-ray diffraction on powders and single crystals: MgCuAl₂-type, *Cmcm*, Z = 4, a = 431.9(1), $b = 1015.7(4), c = 835.7(2) \text{ pm}, wR2 = 0.0436, 326 F^2$ values, 16 variables for LaPdCd₂ and a = 420.26(8), $b = 981.0(2), c = 815.3(1) \text{ pm}, wR2 = 0.0404, 604 F^2 \text{ val-}$ ues, 17 variables for PrNi_{0.951(4)}Cd₂. A small nickel deficit was observed for the PrNi_{0.951(4)}Cd₂ crystal. The cadmium atoms build up orthorhombically distorted three-dimensional networks (Cd–Cd distances: 302–334 pm) that resemble the structure of hexagonal diamond, lonsdaleite. Together with the palladium (nickel) atoms, [PdCd₂] and [Ni_{0.951(4)}Cd₂] networks are formed which leave distorted hexagonal channels for the rare earth atoms.

Key words: Cadmium, Intermetallics, Crystal Chemistry