Synthesis and Structure of RE_2Rh_2Cd (RE = La, Ce, Pr, Nd, Sm)

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New intermetallic cadmium compounds RE_2Rh_2Cd (RE = La, Ce, Pr, Nd, Sm) were synthesized from the elements in sealed tantalum tubes in a high-frequency furnace. They were characterized through X-ray powder data: Mo_2FeB_2 type, space group $P4/mbm$, $Z = 2$. Single crystal data of the cerium compound (a = 762.8(1), c = 377.8(1) pm, $wR2$ = 0.0662, 199 F^2 values, and 13 variable parameters) revealed small defects on the rhodium position leading to the composition $Ce_2Rh_{1.86(3)}Cd$ for the investigated crystal. According to the course of the cell volumes Ce_2Rh_2Cd may be classified as a mixed-valent compound. The Ce_2Rh_2Cd structure is an intergrowth of slightly distorted AlB_2 and CsCl related slabs of compositions $CeRh_2$ and $CeCd$. Within the $CeRh_2$ slab short Ce-Rh contacts (284–300 pm) are indicative of strong Ce-Rh bonding. The Rh-Rh distance within the AlB_2 related slab is 289 pm.