Transition Metal-centered Trigonal Prisms as Building Units in $RE_{14}T_3In_3$ (RE = Y, Ho, Er, Tm, Lu; T = Pd, Ir, Pt) and Y_4IrIn

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The indides $RE_{14}T_3In_3$ (RE = Y, Ho, Er, Tm, Lu; T = Pd, Ir, Pt) and Y_4IrIn were synthesized from the elements by arc-melting and subsequent annealing for crystal growth. Their structures were characterized on the basis of X-ray powder and single crystal data: $Lu_{14}Co_3In_3$-type, space group $P4_2/nmc$, a = 970.2(1), c = 2340.7(5) pm for $Y_{13.95}Pd_3In_{3.05}$, a = 959.7(1), c = 2309.0(5) pm for $Ho_{14}Pd_{2.95}In_3$, a = 955.5(1), c = 2305.1(5) pm for $Er_{14}Pd_3In_3$, a = 950.9(1), c = 2291.6(5) pm for $Tm_{13.90}Pd_3In_{3.10}$, a = 944.4(1), c = 2275.5(5) pm for $Lu_{13.93}Pd_3In_{3.07}$, a = 962.9(1), c = 2343.0(5) pm for $Y_{13.86}Ir_{2.97}In_{3.02}$, a = 967.6(1), c = 2347.8(5) pm for $Y_{13.92}Pt_{3.05}In_{2.91}$, and Gd_4RhIn-type, space group $F\bar{4}3m$, a = 1368.6(2) pm for Y_4IrIn. The main structural motifs are transition metal-centered trigonal prisms of the rare earth elements which are condensed to two-dimensional networks in the $RE_{14}T_3In_3$ indides and to a three-dimensional one in Y_4IrIn. The indium atoms in both structure types show segregation in the metal-rich matrix, *i. e.* In_2 dumbbells in the $RE_{14}T_3In_3$ indides (309 pm In2–In2 in $Y_{13.86}Ir_{2.97}In_{3.02}$) and In_4 tetrahedra (322 pm In–In) in Y_4IrIn. The crystal chemical peculiarities of both structure types are discussed.

Key words: Metal-rich Compounds, Intermetallics, Crystal Structure