New Indides $Sc_6Co_{2.18}In_{0.82}$, $Sc_{10}Ni_9In_{19.44}$ and $ScCu_4In$ – Synthesis, Structure, and Crystal Chemistry

Roman I. Zaremba[a], Yaroslav M. Kalychak[b], Ute Ch. Rodewald[a], Rainer Pöttgen[a], and Vasyl' I. Zaremba[b]

[a] Institut für Anorganische und Analytische Chemie, Westfälische Wilhelms-Universität Münster, Corrensstraße 30, 48149 Münster, Germany
[b] Inorganic Chemistry Department, Ivan Franko National University of Lviv, Kyryla and Mephodiya Street 6, 79005 Lviv, Ukraine

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

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New indides $Sc_6Co_{2.18}In_{0.82}$, $Sc_{10}Ni_9In_{19.44}$ and $ScCu_4In$ have been synthesized from the elements by arc-melting. Single crystals were grown by special annealing modes. The thee indides were investigated *via* X-ray powder and single crystal diffraction: Ho_6Co_2Ga type, *Immm*, $a = 886.7(3)$, $b = 878.0(2)$, $c = 932.1(3)$ pm, $wR2 = 0.0517$, 711 F^2 values, 35 variables for $Sc_6Co_{2.18}In_{0.82}$, $Ho_{10}Ni_9In_{20}$ type, $P4/nmm$, $a = 1287.5(2)$, $c = 884.7(1)$ pm, $wR2 = 0.0642$, 1221 F^2 values, 63 variables for $Sc_{10}Ni_9In_{19.44}$, and $MgCu_4Sn$ type, $F\bar{4}3m$, $a = 704.03(7)$ pm, $wR2 = 0.0267$, 101 F^2 values, and 7 variables for $ScCu_4In$. The scandium rich indide $Sc_6Co_{2.18}In_{0.82}$ contains two Co_2 dumb-bells at Co–Co distances of 221 and 230 pm. Each cobalt atom within these dumb-bells has a tricapped trigonal prismatic coordination. The In1 site has a distorted cube-like coordination by scandium and shows a mixed occupancy (36%) with cobalt. The In2 atoms have distorted icosahedral scandium coordination. As a consequence of the small size of the scandium atoms, the In4 site in $Sc_{10}Ni_9In_{19.44}$ shows defects and was furthermore refined with a split model leading to a new distorted variant within the family of $Ho_{10}Ni_9In_{20}$ compounds. $ScCu_4In$ is an ordered version of the cubic Laves phase with scandium and indium atoms in the CN16 voids of the copper substructure. The Cu–Cu distances within the three-dimensional network of corner-sharing tetrahedra are 248.6 and 249.2 pm. The crystal chemical peculiarities of these three indide structures are briefly discussed.

Key words: Scandium, Intermetallics, Crystal Chemistry, Chemical Bonding