Synthesis, Structure, and Magnetic Properties of CeNiIn2

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Single crystals of the ternary indide CeNiIn\textsubscript{2} were synthesized from an indium flux. An arc-melted button of the starting composition CeNiIn\textsubscript{2} was annealed in a zirconia crucible with a slight excess of indium at 1200 K followed by slow cooling (5 K/h) to 870 K. The new indide has been investigated by X-ray diffraction on powders and single crystals: PrNiIn\textsubscript{2} type, \textit{Cmcm}, \(a = 440.78(4)\), \(b = 1834.3(1)\), \(c = 2178.8(2)\) pm, \(wR_2 = 0.0753\) for 1471 \(F^2\) values and 66 variable parameters. The structure contains three crystallographically independent nickel positions which have a distorted trigonal prismatic coordination. The CeNiIn\textsubscript{2} structure is related to the MgCuAl\textsubscript{2} structure by chemical twinning. The shortest interatomic distances occur for Ni–In and In–In contacts. The nickel and indium atoms form a complex three-dimensional [NiIn\textsubscript{2}] network in which the cerium atoms fill distorted pentagonal channels. Magnetic susceptibility measurements indicate Curie-Weiss behavior with an experimental magnetic moment of 2.44(3) \(\mu_B/\text{Ce}\) atom. At 3.4(3) K CeNiIn\textsubscript{2} orders ferro- or ferromagnetically. The experimental saturation magnetization at 2 K and 5.5 T is 0.95(2) \(\mu_B/\text{Ce}\).