The Gold-rich Indide $Eu_5Au_{17.7}In_{4.3}$ and its Relation with the Structures of $SrAu_{4.76}In_{1.24}$ and $BaLi_4$

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The gold-rich indide $Eu_5Au_{17.7}In_{4.3}$ was synthesized from the elements in a sealed tantalum ampoule that was heated in a high-frequency furnace. $Eu_5Au_{17.7}In_{4.3}$ crystallizes with a new monoclinic structure type: $C2/m$, a = 902.7(2), b = 722.8(3), c = 1734.1(4) pm, β = 94.31(3)°, $wR2$ = 0.0907, 2640 F^2 values and 74 variables. $Eu_5Au_{17.7}In_{4.3}$ has a pronounced gold substructure with Au–Au distances ranging from 278 to 300 pm. The striking structural motifs in the gold substructure are networks of Au_6 hexagons and discrete units of corner- and edge-sharing Au_4 tetrahedra. $Eu_5Au_{17.70}In_{4.30}$ exhibits a small homogeneity range with In/Au mixing on two Wyckoff sites. Geometrically, the $Eu_5Au_{17.7}In_{4.3}$ structure can be explained as an intergrowth variant of slightly distorted $SrAu_{4.76}In_{1.24}$- and $BaLi_4$-related slabs. The europium coordination in the $BaLi_4$ slabs is similar to binary $EuAu_2$.

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