

New Compounds $RE(\text{Zn},\text{Al})_8$ and $\text{Yb}_4\text{Zn}_{20.3}\text{Al}_{12.7}$ and their Crystal Structures

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Z. Naturforsch. **61b**, 779 – 784 (2006); received January 31, 2006

Dedicated to Professor Wolfgang Jeitschko on the occasion of his 70th birthday

The crystal structures of several new compounds have been determined using X-ray analysis. The intermetallic compound HoZn_5Al_3 ($a = 8.586(3)$, $c = 16.538(5)$ Å, $R_F = 0.0413$, $R_W = 0.0521$) has its own structure type (space group $I4/mmm$), which has been found for the first time. The following compounds are isostructural with the previous one: $\text{YZn}_{5.52}\text{Al}_{2.48}$ ($a = 8.6183(1)$, $c = 16.5048(3)$ Å, $R_I = 0.078$, $R_P = 0.116$), $\text{DyZn}_{4.96}\text{Al}_{3.04}$ ($a = 8.5887(1)$, $c = 16.5002(3)$ Å, $R_I = 0.077$, $R_P = 0.114$), $\text{ErZn}_{5.37}\text{Al}_{2.63}$ ($a = 8.5525(2)$, $c = 16.3997(5)$ Å, $R_I = 0.081$, $R_P = 0.111$), $\text{TmZn}_{5.64}\text{Al}_{2.36}$ ($a = 8.70429(8)$, $c = 16.3943(4)$ Å, $R_I = 0.088$, $R_P = 0.095$), $\text{LuZn}_{5.58}\text{Al}_{2.42}$ ($a = 8.5616(1)$, $c = 16.3052(3)$ Å, $R_I = 0.081$, $R_P = 0.101$). The intermetallic compound $\text{Yb}_4\text{Zn}_{20.3}\text{Al}_{12.7}$ ($a = 8.6183(1)$, $c = 16.5048(3)$ Å, $R_I = 0.085$, $R_P = 0.112$) adopts the $\text{Yb}_8\text{Cu}_{17}\text{Al}_{49}$ – type structure (space group $I4/mmm$). The relationship between the HoZn_5Al_3 -type and the $\text{Yb}_8\text{Cu}_{17}\text{Al}_{49}$ -type structures is discussed.

Key words: Intermetallic Compound, Crystal Structure, Rare Earth Metal, X-Ray Diffraction