Die Kristallstrukturen von $Ni(AlCl_4)_2$, $Ni(GaCl_4)_2$ und $Na[Ni(AlCl_4)_3]$

Crystal Structures of $Ni(AlCl_4)_2$, $Ni(GaCl_4)_2$ and $Na[Ni(AlCl_4)_3]$

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The crystal structures of $Ni(AlCl_4)_2$, $Ni(GaCl_4)_2$ and $Na[Ni(AlCl_4)_3]$ were determined by single crystal X-ray structure analysis. $Ni(AlCl_4)_2$ and $Ni(GaCl_4)_2$ are isotypic and crystallize in the $Co(AlCl_4)_2$ structure type ($I2/c$, a = 1276.40(9)/1268.48(7), b = 771.41(5)/757,74(3), c = 1145.47(8)/1154.34(7) pm, β = 92.067(3)/91.778(4)°, Z = 4). The structure contains chains of $NiCl_6$ octahedra and $AlCl_4$/$GaCl_4$ tetrahedra linked by corners and edges.

$Na[Ni(AlCl_4)_3]$ represents a new structure type ($P2_1/c$, a = 1356.34(6), b = 1200.82(6), c = 1213.31(6) pm, β = 105.647(6)°, Z = 4). Its characteristic feature is the chiral $[Ni(AlCl_4)_3]^-$ anion which is found here for the first time. The tetrachloroaluminate ions serve as bidentate ligands leading to an octahedral coordination of the nickel atom.

Key words: Nickel, Tetrachloroaluminate, Tetrachlorogallate, Crystal Structure