The crystal structures of Ni(AlCl4)2, Ni(GaCl4)2 and Na[Ni(AlCl4)3] were determined by single crystal X-ray structure analysis. Ni(AlCl4)2 and Ni(GaCl4)2 are isotypic and crystallize in the Co(AlCl4)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 NiCl6 octahedra and AlCl4/GaCl4 tetrahedral linked by corners and edges.

Na[Ni(AlCl4)3] represents a new structure type (P21/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(AlCl4)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