# Kristallstruktur und Eigenschaften von Chrom(II)-Tetrachloroaluminat

Crystal Structure and Properties of Chromium(II)-Tetrachloroaluminate

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Chromium(II)tetrachloroaluminate can be prepared by reaction of chromium, chromium trichloride and aluminum trichloride in the molar ratio 1 : 1.94 : 5.79 or by reaction of stoichiometric amounts of chromium dichloride and aluminum trichloride. Sublimation of the compound yields phase-pure samples of colourless crystals. $Cr(AlCl_4)_2$ crystallizes in the non-centrosymmetric orthorhombic space group $Pca2_1$ (No. 29), $a$ = 1511.38(3), $b$ = 604.71(1), $c$ = 1301.76(3) pm. The aggregation of $Cr(AlCl_4)_2$ molecules leads to a square-bipyramidal coordination of the chromium atom typical of high-spin $d^4$ ions due to the Jahn-Teller effect. The relationship to centrosymmetric $Pd(AlCl_4)_2$ ($P2_1/c$) which is built up of similar molecules was established by means of a group-subgroup symmetry tree. The temperature dependence of the magnetic susceptibility agrees with Curie-Weiss behaviour ($\mu_{eff}$ = 4.70 $\mu_B$, $\Theta$ = −1.3 K).

*Key words:* Chromium, Tetrachloroaluminate, Crystal Structure, Jahn-Teller Distortion, Group-Subgroup Relations