The Syntheses of Hydrotalcite-Like Compounds and Their Structures and Physico-Chemical Properties I: The Systems Mg^{2+}-Al^{3+}-NO_3^-, Mg^{2+}-Al^{3+}-Cl^-, Mg^{2+}-Al^{3+}-ClO_4^-, Ni^{2+}-Al^{3+}-Cl^- and Zn^{2+}-Al^{3+}-Cl^-

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Abstract: The basic salts of this system were prepared and their structures and physico-chemical properties were studies by electron microscopy, chemical analysis, X-ray powder diffraction, thermal analysis, i.r. absorption spectra, BET absorption, and acidity-basicity measurements. The salts were found to be new compounds analogous to hydrotalcite. They can be expressed by the formula; $[M_x^{2+} M_y^{3+}(OH)_{2(x+y)}]^{y+} [A_{z_1}^{-} A_{z_2}^{2-} \cdot mH_2O]^{-(z_1+2z_2)}$ where M^{2+} and M^{3+} denote di- and trivalent cations, A^- and A^{2-} denote mono- and divalent anions, respectively, and $y = z_1 + 2z_2$; $z_1 \gg z_2$.

The structures consist of positively charged $Cd(OH)_2$-1ike basic layers and intermediate layers formed from anions and water molecules with the solid solution of divalent cation (M^{2+}) and trivalent cation (M^{3+}) being formed in the range of $0.6<x/(x+y)<0.9$. The anions of Cl^-, NO_3^- and ClO_4^- are easily substituted by CO_3^{2-}. A large part of the NO_3^- makes a monodentate-type bond and the ClO_4^- a bridge-type bond.

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