
Anion-Exchange Properties of Hydrotalcite-Like Compounds

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Abstract: Ion-exchange isotherms between hydrotalcite-like compounds (HT) of the NO_3^- , Cl^- , and SO_4^- forms and F^- , Cl^- , Br^- , I^- , OH^- , SO_4^{2-} , CO_3^{2-} , and Naphthol Yellow S (NYS^{2-}) ions were determined, and the spacing and the width of the 003 reflection were measured as a function of HT composition. The ion-exchange equilibrium constant for HTs of monovalent anions are in the sequence $\text{OH}^- > \text{F}^- > \text{Cl}^- > \text{Br}^- > \text{NO}_3^- > \text{I}^-$, those for divalent anions are in the sequence $\text{CO}_3^{2-} > \text{NYS}^{2-} > \text{SO}_4^{2-}$. The ion-exchange equilibrium constants tend to increase as the diameters of the anions decrease, and the crystallite size in the 001 direction tends to increase with anions having higher selectivity. The OH-form of HT has the smallest basal spacing and the largest crystallite size in the 001 direction.

Key Words: Anion exchange • Anion selectivity • Crystallite size • Hydrotalcite • Naphthol Yellow S • X-ray powder diffraction

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