Acid Character of Sauconite: Increase in Cation Exchange Capacity on Aging in Water and the Role of Zn^{2+} and Al^{3+} Ions

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Abstract: pH- and conductometric titration curves of acid sauconite, freshly prepared by the action of H-resin on sauconite showed four segments, each, where H^+, Al^{3+} and Zn^{2+} ions and a weak acid reacted with the added base in the sequence mentioned. The H^+, Al^{3+} and Zn^{2+} ions, but not the weak acid, could be exchanged for the cations of a neutral salt. The exchangeable Al^{3+} and Zn^{2+} ions were derived from the lateral surfaces by the action of the H-resin. When the acid sauconite was allowed to age in water, the exchangeable H^+ and Al^{3+} ions were gradually replaced by Zn^{2+} ions giving, finally, a Zn-clay. The pH rose from 4 · 2 to 6 · 3 and the total amount of exchangeable cations increased as aging proceeded. When the Zn-clay was formed, the increase in cation exchange capacity was about 70 per cent. Octahedral Al at the edges, carrying positive charges, were discharged by hydrolysis during the aging, causing the net negative charge and, hence, cation exchange capacity, to increase. Aging had little effect on the amount of the weak acid. Zn and Al ions at the edges exhibited the weak acid function. Only edge-Zn was active in the fully aged clay.

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