
Reduction and Oxidation of Fe³⁺ in Dioctahedral Smectites—1: Reduction with Hydrazine and Dithionite

I. Rozenson and L. Heller-Kallai

Dept. of Geology, Hebrew University, Jerusalem, Israel

Abstract: Hydrazine and dithionite, both of which are strong reducing agents, react differently with various dioctahedral smectites. Both the nature of the reducing agent and the structure of the clay affect the course of the reaction. Hydrazine reduces octahedral Fe³⁺ efficiently if the mineral has a low tetrahedral charge. The reducing action of dithionite does not depend upon the charge.

The results obtained by different physical methods of investigation suggest that reduction of iron is associated with protonation of an adjacent OH group. The Fe²⁺ formed is readily re-oxidised but the structural change occurring on reduction are reversible only when Al-OH-Fe, but not when Fe-OH-Fe associations are involved. Reaction mechanisms are proposed and changes in the distribution of iron in the octahedral sites are discussed.

Clays and Clay Minerals; December 1976 v. 24; no. 6; p. 271-282; DOI: [10.1346/CCMN.1976.0240601](https://doi.org/10.1346/CCMN.1976.0240601)

© 1976, The Clay Minerals Society

Clay Minerals Society (www.clays.org)
