
Dodecylammonium-Mica Complexes-II Characterization of the Reaction Products

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Abstract: Interlayer potassium was removed from a wide range of mica minerals by treatment with dilute solutions of *n*-dodecylammonium chloride. On subsequent reaction with the appropriate metal methoxide, the Na⁺ or Ca²⁺ form of the altered mica was produced. The properties of the original and sodium saturated samples were compared to assess the changes in water content, charge density and chemical composition (particularly ferrous iron) which resulted from the displacement of potassium.

Calculation of structural formulae was not attempted since it was established that for the altered samples accurate distinction could not be made between adsorbed and structural water. Changes in layer charge are thus expressed on the basis of samples ignited to 1000° C. Charge losses of up to 76 me/100 g were recorded for biotites, smaller charges were noted for phlogopites and no loss was observed for the two muscovites examined.

Oxidation of ferrous iron occurred for all trioctahedral samples, the greatest oxidation occurring in the samples initially high in iron. There was no consistent relationship between the amount of iron oxidized and the loss of layer charge.

All altered samples contained greater amounts of H₂O⁺ than the original materials suggesting that protonation of structural oxygens occurred during, or following, removal of potassium.

It is concluded that the alteration of micas by reaction with organic cations is a complex process, differing in detail for different micas, and following a similar path to alteration by reaction with inorganic salts.

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