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# Oxidation and Reduction of Structural Iron in Chlorite at 480° C

Ole K. Borggaard, Holger B. Lindgreen and Steen Mørup

Chemistry Department, Royal Veterinary and Agricultural University Thorvaldsensvej 40, DK-1871 Copenhagen V, Denmark

Geochemistry Department, Danish Geological Survey Thoravej 31, DK-2400 Copenhagen NV, Denmark

Laboratory of Applied Physics II, Technical University of Denmark DK-2800 Lyngby, Denmark

**Abstract:** An iron-rich chlorite, ripidolite, was oxidized by air-heating at 480° i.e., below the dehydroxylation temperature and subsequently reduced in hydrogen at the same temperature. On the basis of chemical, differential thermal, infrared, Mössbauer, and X-ray powder diffraction analyses, Fe(II) seems to be present only in the 2:1 layer of the original chlorite in a type of site similar to that of Fe(II) in biotite, with OH in *cis*-positions. These data also suggest that octahedral Al and Fe(III) are located in the hydroxide sheet of the original chlorite. The structural changes of the mineral due to the oxidation and the subsequent reduction appear limited to minor structural rearrangements and, perhaps, to the introduction of OH in both *cis*- and *trans*-positions. The results of the investigation are in agreement with a reaction of the form:  $[\text{Fe(II)OH}]^+ = [\text{Fe(III)O}]^+ + \text{H} (\text{H}^+ + \text{e}^-)$ .

**Key Words:** Chlorite • Infrared spectroscopy • Iron • Mössbauer spectroscopy • Oxidation • Reduction

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