Development of Microporosity in Clinochlore Upon Heating

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Abstract: The " modified chlorite structure " forms by the dehydroxylation of the interlayer octahedral sheet of magnesian chlorite at around 500 ° C and results in a structure with a basal spacing near 27 Å (Brindley and Chang 1974). This process involves drastic textural modifications as indicated by gas adsorption experiments which reveal the formation of structural micropores. Infrared spectroscopy as well as thermogravimetry and mass spectrometric analysis show that these micropores are filled with molecular atmospheric water, carbon dioxide, nitrogen, argon and hydrocarbons which condense once the samples cool down. A high temperature treatment is needed in order to release the different phases. A heterogeneous dehydroxylation mechanism is proposed in which micropores are formed in donor regions and magnesium and oxygen are concentrated in acceptor regions. This leads to a 27 Å structure with micropore zones and enriched interlayer oxide zones alternating along the z-axis of the mineral.

Key Words: Clinochlore • Dehydroxylation • Micropores

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