
Brønsted Acidification Observed during Hydrothermal Treatment of a Calcium Montmorillonite

Robert B. Heimann¹

Department of Mining, Metallurgical, and Petroleum Engineering, University of Alberta Edmonton, Alberta, Canada T6G2G6

¹ Present address: Institute for Mineralogy and Geochemistry, Freiberg University of Mining and Technology, D-09596 Freiberg, Germany.

Abstract: An aluminous Ca-montmorillonite from southern Manitoba, Canada, has been shown to generate very low pH values in clay/groundwater slurries over a range of ionic strength of the groundwater (fresh and saline) and temperatures from 25° – 90° C. Dialysis experiments as well as results of X-ray diffraction and FTIR vibration spectroscopy point to an acidification mechanism that involves hydrolysis of exchangeable Al³⁺ ions, thus releasing protons, and the subsequent intercalation of gibbsite-like hydroxy-Al complexes into the smectite lattice forming a non-expandable “ Al ” -montmorillonite.

Key Words: Aluminium • Ca-smectite • Gibbsite-type intercalates

Clays and Clay Minerals; December 1993 v. 41; no. 6; p. 718-725; DOI: [10.1346/CCMN.1993.0410610](https://doi.org/10.1346/CCMN.1993.0410610)
© 1993, The Clay Minerals Society
Clay Minerals Society (www.clays.org)
