
The Intercalation of Kaolinite by Alkali Halides in the Solid State: A Systematic Study of the Intercalates and Their Derivatives

John G. Thompson¹, Neil Gabbitas¹ and Philippa J. R. Uwins²

¹ Research School of Chemistry, Australian National University Canberra ACT 0200, Australia

² Centre for Microscopy and Microanalysis, University of Queensland QLD 4072, Australia

Abstract: Kaolinite: alkali halide intercalates have been successfully prepared by grinding the salt with kaolinite in the absence of water. Rate of intercalation is shown to correlate negatively with melting point of the salt. The basal dimensions of the intercalates increase with increasing size of the ion. As shown recently for kaolinite: NaCl intercalate, the layered structure survives the dehydroxylation of the kaolinite at 500° – 600° C, at which point the excess alkali halide can be removed by rinsing to give an XRD-amorphous material. This amorphous material, of approximate stoichiometry $MAlSiO_4$, reacts at surprisingly low temperatures to give crystalline phases, apparently of the same stoichiometry, with structures closely related to eucryptite (M = Li), carnegieite (M = Na), kalsilite (M = K), and leucite (M = K, Rb, Cs). The relationships between the structures of the reaction products are discussed.

Key Words: Alkali halide • Intercalate • Kaolinite • Structure • Synthesis • XRD

Clays and Clay Minerals; February 1993 v. 41; no. 1; p. 73-86; DOI: [10.1346/CCMN.1993.0410108](https://doi.org/10.1346/CCMN.1993.0410108)

© 1993, The Clay Minerals Society

Clay Minerals Society (www.clays.org)
