
Genesis and Morphology of Iron Sulfides in Gray Kaolins

G. Norman White¹, J. B. Dixon¹, R. M. Weaver² and A. C. Kunkle²

¹ Department of Soil and Crop Sciences, Texas A&M University College Station, Texas 77843

² J. M. Huber Corporation, Huber, Georgia 31298

Abstract: Many of the presently oxidized Georgia kaolins probably existed originally in the reduced (gray) state. For that reason, the distribution of iron sulfides in presently gray kaolins may elucidate features observed in oxidized kaolins. An understanding of the nature of gray kaolins may also aid in the development of processing strategies for the exploitation of these abundant resources. The size, morphology, and degree of crystallite bonding of iron sulfides (pyrite and marcasite) in three gray kaolin cores from the Macon, Georgia kaolin district were examined by X-ray powder diffraction, X-ray fluorescence, scanning electron microscopy, and other physical and chemical methods. Pyrite and marcasite were identified as dominantly gravel- and sand-size equant crystals and crystal aggregates, rather than as framboids. Pyrite crystals commonly showed rough octahedral faces, which extended over minor cube faces. Locally, spiral growth dislocations were also observed. Marcasite was found in radiating, prismatic, and tabular crystals. In general, the marcasite crystal aggregates were much more fragile than those of pyrite. The dominance of octahedral crystal shapes and textures of the pyrite suggest inorganic precipitation from solutions supersaturated with respect to octahedral crystal faces.

Key Words: Kaolinite • Marcasite • Morphology • Oxidation • Pyrite • Scanning electron microscopy • Sulfide

Clays and Clay Minerals; February 1991 v. 39; no. 1; p. 70-76; DOI: [10.1346/CCMN.1991.0390109](https://doi.org/10.1346/CCMN.1991.0390109)

© 1991, The Clay Minerals Society

Clay Minerals Society (www.clays.org)
