Resilication of Bauxite at the Alabama Street Mine, Saline County, Arkansas, Illustrated by Scanning Electron Micrographs

W. D. Keller[1] and Otis M. Clarke Jr.[2]

[1] University of Missouri—Columbia, Columbia, Missouri 65211
[2] Alabama Geological Survey, University, Alabama 35486

Abstract: Resilication of bauxite produced kaolin at and beneath an old erosion surface on bauxite at the Alabama Street Mine of ALCOA in Saline County, Arkansas. The transitional alteration can be traced in morphology by scanning electron microscopy, (SEM) and in Al:Si ratio by energy dispersive analysis. In one illustrated example, the sequence of resilication took place within 1 mm thickness; in another, across 80 ram. The first morphologic alteration of gibbsite (bauxite) appears to be to allophane that occurs in micrometer-size plates which show elongate cracking and/or straight to highly curved elongate edges. The next phase is kaolinite, first in micrometer-size flakes followed by coarser flakes that grade into a zone of typical stacked kaolinite, likewise identified by X-ray powder diffraction. Notably large stacks and small flakes of kaolinite are intimately mixed in the SEMs, thus suggesting that unequal sizes of kaolinite crystals can grow during one episode of an in-situ genesis.

Key Words: Allophane • Al:Si ratio • Bauxite • Gibbsite • Kaolinite • Resilication • Scanning electron microscopy

Clays and Clay Minerals; April 1984 v. 32; no. 2; p. 139-146; DOI: 10.1346/CCMN.1984.0320208

Clay Minerals Society (www.clays.org)