
Physical Arrangement of High-Alumina Clay Types in a Missouri Clay Deposit and Implications for their Genesis

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Abstract: Sedimentologic zones that are differentiated by changes in lithology, mineralogy, chemical composition, and crystal morphology observable in scanning electron micrographs occur in Missouri high-alumina clay deposits. These properties and changes suggest that the high-alumina materials originated from Pennsylvanian-age, paludal sediments deposited in depressions underlying Paleozoic carbonate rocks. Alumina was relatively enriched in zones of the deposits by leaching of silica and of alkali and alkaline earth metals from the sediments. The most intense leaching occurred on the highest parts of the Ozark Dome.

Diaspore is the predominant high-alumina mineral. Boehmite, although far less abundant than diaspore, may have paragenetically preceded diaspore in some deposits. Chlorite, presumably an Al-rich variety because the content of MgO is typically <0.5%, is also present. Li, which is sporadically present, is inferred to have accumulated in the chlorite which may be a proto-variety of cookeite. Because Li^+ and Al^{3+} are similar in size, Li is inferred to have accompanied Al as a resistate element in contrast to K and Na which were leached from parent phyllosilicates.

Key Words: Boehmite • Burley clay • Chlorite • Diaspore • Flint clay • Genesis • Lithium • Scanning electron microscopy

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