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# Microstructure, Mineralogy and Chemistry of Cambrian Glauconite Pellets and Glauconite, Central U.S.A.

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**Abstract:** Glauconite pellets in the Cambrian of the central U.S.A. frequently contain two textural forms of glauconite—aggregate and oriented—which differ in both mineralogy and chemistry. The aggregate glauconite composes the bulk of most pellets and consists of crystals in a nearly random arrangement. The oriented glauconite occurs primarily as rims on the periphery of pellets. It has a honeycomb-like structure—the crystals are oriented with their *c*-axes tangent to the aggregate-textured cores. Scanning electron photomicrographs show that the aggregate and oriented textures grade one into the other.

The aggregate glauconite has a 1 M structure and less than 5% expandable layers, whereas the oriented form has a 1 *Md* structure and ~ 10% expandable layers. The aggregate glauconite contains 5– 8% more total iron oxides and 2– 3% less Al<sub>2</sub>O<sub>3</sub> than the oriented glauconite. The *b*-cell dimension of individual samples increases nearly linearly with increasing octahedral Fe<sup>3+</sup> + Fe<sup>2+</sup> + Mg content. Chemical and crystallographic variations among various samples are, for the most part, related to the ratio of aggregate to oriented glauconite.

The transition between the texture of the aggregate and oriented glauconite suggests that some glauconite pellets may form by concretionary growth. It is proposed that Cambrian glauconite pellets grew through the repetitive development of a smectite-like clay at the margin of pellets. The smectite was later altered, both chemically and texturally, first to the oriented and then to the aggregate-textured glauconite.

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