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# Effect of Silicate Species on the Transformation of Ferrihydrite into Goethite and Hematite in Alkaline Media

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**Abstract:** The transformation of ferrihydrite to goethite and/or hematite in alkaline media is strongly retarded by the presence of silicate species. These species probably stabilize ferrihydrite by adsorbing on the particles of ferrihydrite and linking them into an immobile network.

At concentrations low enough for the transformation to proceed, silicate species promote the formation of hematite and hinder the nucleation of goethite. The presence of silicate species modifies the morphology of both reaction products. Hematite forms ellipsoidal single crystals, commonly displaying outgrowths of goethite. Silicate species in solution appear to enhance the development of the (021) faces of goethite, probably by preferential adsorption on these faces; at high levels of silicate species, goethite crystals adopt a pseudo-hexagonal habit. This morphology has not been observed previously for goethite.

**Key Words:** Ferrihydrite • Goethite • Hematite • Morphology • Silicate • Transmission electron microscopy

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