



## The transformation of ferrihydrite into goethite or hematite, revisited

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During the oxidation of iron, poorly crystallized phases are firstly formed: 2- and 6-line ferrihydrite, which presents for the last phase, a similarity with wustite  $\text{FeO}$  but also with hematite  $\alpha\text{-Fe}_2\text{O}_3$ . Crystallization increases with time and the solid phase obtained is dependent on temperature and pH. Obviously, high temperature favours the formation of the oxide hematite  $\alpha\text{-Fe}_2\text{O}_3$ . As for the pH factor, it is more complicated. Low and high values of pH (2–5 and 10–14) favour the formation of goethite  $\alpha\text{-FeOOH}$ , while obtaining hematite is favoured at neutral pH (values around 7). Goethite or hematite are obtained either through a dissolution–crystallization process or in the solid state, through a topotactic transformation.

Given the structural relationships observed between ferrihydrite and wustite and hematite, it is allowed to think that a structural continuity could exist between wustite  $\text{Fe}_{(1-x)}\text{O}$  and hematite via ferrihydrite.