

Incorporation of molybdate anion into β -FeOOH

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ABSTRACT

An analog of β -FeOOH (akaganéite) containing structurally incorporated molybdate has been synthesized and the conditions for its formation have been studied in the presence of chloride, sulfate, and nitrate anions. The incorporation of molybdate into the β -FeOOH structure has been shown to greatly increase the stability of this phase with respect to its transformation to hematite at elevated temperature. Molybdate incorporation also has been shown to change the particle morphology, with increasing amounts of molybdate causing the rod-shaped nanoparticles to become progressively shorter until spherical nanocrystals are observed. The combined observations of increased stability, morphology changes, and measured levels of incorporated molybdenum suggest that although inclusion of molybdate anions into the β -FeOOH tunnel sites is possible, it is unlikely to be the only mode of molybdate incorporation.

Keywords: β -FeOOH, molybdate, anion incorporation, phase transformation