



Characterization of the dissolution of tooeleite under *Acidithiobacillus ferrooxidans* relevant to mineral trap for arsenic removal

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ABSTRACT

The mineral tooeleite ($\text{Fe}_6(\text{AsO}_3)_4\text{SO}_4(\text{OH})_4 \cdot 4\text{H}_2\text{O}$) is a secondary mineral containing-As(III) in acid mine drainage, and is proposed as a candidate for arsenic immobilization technology. The dissolution interaction of tooeleite with *Acidithiobacillus ferrooxidans* was investigated by batch experiments. The arsenic released from tooeleite decreases with pH increase due to the adsorption of arsenic on iron hydroxide. The amount of arsenic released from tooeleite at pH 2 is increased by 3.2 times as compared to the dissolution under only culture medium, which reaches 345 mg/L. The bacterial activity has a strong effect on the arsenic amount released from tooeleite. The incongruent dissolution was observed for tooeleite when pH is >3. The infrared spectroscopy and XRD both identified the alteration product of tooeleite as jarosite. This information is useful for immobilizing arsenic and is proposed as a suitable mechanism for trapping arsenic.

Keywords: Arsenic remediation; Arsenic release; Arsenic dissolution; Tooeleite; Jarosite

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