

Treatment of tellurium containing stream using ferrite process and its characterization

Shin-Jo Kim*, Ki-Yong Lee

Water Environment Research Department, National Institute of Environmental Research, Environmental Research Complex Kyungseo-Dong, Seo-Gu, Incheon City 404-708, Republic of Korea
Tel. +82 (32) 560-7515; Fax +82 (32) 568-2037; email: sjkim1212@korea.kr

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ABSTRACT

Ferrite containing heavy metals is precipitated when heavy metal ions come into coexistence in the wet method of the ferrite process. Based on this theory, this paper examines the treatable limitation, actual shape beyond that limitation, and the property of the sludge formed on tellurium compound restricted by the Basel Convention as a hazardous heavy metal. We have discovered that the ferrite process treatment could be applied in tellurium solution with the initial concentration up to 25 ppm. Furthermore, we are able to confirm that when the initial concentration exceeds 25 ppm, tellurium ion tends no longer to be incorporated into the spinel structure of ferrite with causing difficulties in the ferrite process. The applicable limitation from the experiment results of this study on tellurium treatment by ferrite process appears to be around 25 ppm for both Te^{4+} and Te^{6+} . In both cases, needle shaped crystal of $\alpha\text{-FeOOH}$ (Goethite), which is a by-product of ferrous hydroxide, can no longer be observed in accordance with hindrance to the growth of ferrite crystal particles in the ferrite sludge obtained at 500 ppm. Sizes of ferrite particles become smaller, that is to say, approximate 0.01–0.02 μm and the growth of crystals shows no progress.

Keywords: Ferrite; Tellurium; Magnetite; Spinel structure; Saturation magnetization

* Corresponding author.