

Immobilization of heavy metals during the tailings sample bioleaching by the indigenous bacteria

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Abstract

The discharge of toxic elements from sulfide tailings into the aquatic environments takes place especially as the activity of indigenous bacteria, which can be prohibited by the passivation layer precipitation as a leaching inhibitor on the other hand. In this research, the reduction of heavy metals mobility to a desirable level through the formation of passivation layer was studied in lab-scale reactors during the tailings bioleaching by the pure cultures of *Acidithiobacillus ferrooxidans* (*A. ferrooxidans*) and *Acidithiobacillus thiooxidans* (*A. thiooxidans*). In fact, we tried to stabilize the trace elements through a safe and stable method by changing the tailings primary mineralogical compound. From two aforesaid bacteria, *A. ferrooxidans* caused to the highest metals solubility after 10 days namely 99% Mn, 91% Cr, 95% Fe and 78% Cu. While after 22 days, a remarkable reduction in metals solubility was observed in the presence of *A. ferrooxidans* due to the elements considerable stabilization by bioleaching residue (30% for Mn and about 20% for Cr, Fe and Cu). The results of electron probe micro-analyzer (EPMA) demonstrated that the metals adsorption on, or co-precipitation with, the passivation layer can be the prominent mechanism for the retardation of toxic element.

Biography

AK Darban completed his PhD at Department of Civil Engineering McGill University, Montreal Canada on 1998. He is professor of environmental engineering and chair of Modares Environmental Research Center (MERC), Tehran, Iran. He has over 250 publications in which 50 papers are international journal in the last three years. He has been serving as an editorial board member of reputed Journals.



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