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Bioleaching of heavy metals from sewage sludge with recirculation of the liquid phase: A mass balance model

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Abstract

Bioleaching of heavy metals from sewage sludge is an effective method for decontamination of sewage sludge. The process is currently under active investigation for its improvement of sewage sludge dewatering. The bioleaching with recirculation of the liquid and solid phases of sewage sludge is of considerable interest for the development of the bioleaching method itself, and for deeper investigation of its influence on the sludge dewatering. This work presents and verifies a mass balance model of elements for bioleaching of heavy metals from sewage sludge by indigenous iron-oxidizing bacteria with recirculation of the liquid phase of the treated sludge. Good correspondence between the model predictions and the performed experiments gives ground for further development of the model to describe substances that are not conserved during the bioleaching, especially extracellular polymeric substances that impede sewage sludge dewatering. The mass balance model is presented in a form that also describes recirculation of the solid phase of sewage sludge during the bioleaching. Recirculation of the liquid and solid phases of sewage sludge during the bioleaching, together with the mass balance model, give useful tools for future

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