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Abstract

A mathematical model for simulating the electrodialytic phosphorus recovery from sewage sludge ash containing heavy metal (Al, Fe, Zn, Cu, Cr, Cd and Ni) is presented. The complex chemical system proposed consists of 46 species including aqueous and solid species. The system setup is modelled as a four compartments: solid, liquid, anode and cathode. In addition to typical phenomena; such as: electromigration of ionic, simple and complex species from the liquid phase to anode and cathode through ionic membranes and diffusion transport; kinetically controlled processes due to non-equilibrium between solid phase and bulk liquid have been incorporated. The simulation results clarify the behavior of heavy metal when an electric current is applied which is essential for the scaling-up of the ED technology.

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