Application of ChemApp models to mine water chemistry

Petteri Kangas, Risto Pajarre, Maria Nappa, Pertti Koukkari

VTT Technical Research Centre of Finland Ltd

Thermochemical models applying ChemApp and the Pitzer interaction formalism have been used to simulate acid mine drainage and various process alternatives for handling of the effluents from metal recovery plants. The applied data system contained the cations Na+/ K+/ H+/ Ca+2/ Mg+2 / Mn+2/ Fe+2/ Fe+3/ Al+3/ Ni+2/ Zn+2/ Cu+2 and anions Cl-/ OH-/ CO3-2/ SO4-2 together with the relevant solid precipitates.

The model framework has been applied to validation studies as well as process development work at the Terrafame nickel, zinc, cobalt and copper mine and metal plant in Sotkamo Finland. The models have been applied to predict behavior and evaluate process alternatives regarding sulphate content in the acid mine drainage, separation of various metal by precipitation and the effect various potential process chemical alternatives. Also discussed are the encountered limitations of the equilibrium models in the simulation work.