

Solubility in Hydrometallurgical Processes

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The present annual world production of iron/steel, aluminium, copper, zinc, lead, nickel and magnesium is close to 1 billion tonnes. Most metals and their alloys are synthesized from oxide, sulphide, and halide sources. Hydrometallurgy is a specialized branch of extractive metallurgy dealing with metal recovery from ores, concentrates, and other metallurgical intermediate products in aqueous phase. These processes operate typically temperatures between 50-250 °C, which is lower than used in pyrometallurgical processes. The knowledge of solubilities of solids and gases in electrolyte systems are required for process development. The best available techniques and continuous improvements are needed to produce environmentally acceptable, energy-efficient processes. Thermodynamic models combined with sound measurements result the ever-smaller input of chemicals, raw materials, water, and minimal carbon dioxide emissions. In this work aqueous sulphuric acid systems have been studied for their interest in metal process industry such as regeneration of pickling acids in stainless steel manufacturing and zinc leaching process. Database development and multiphase thermodynamic model results are discussed.