

## **FACTORS AFFECTING SOLUBILITY OF SOLIDS DURING HYDROMETALLURGICAL EXTRACTION**

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**C**omprehensive understanding of the principles of governing the solubility of minerals is a key to success of many hydrometallurgical extraction strategies. In this study, a careful examination and thermodynamic analysis of some pertinent factors governing the solubility of solids has been carried out. In particular, the effect of ionic strength, crystal structure-composition of minerals, and various anions present in the solution on the solubility of solids has been presented and their potential impact in the overall extraction of minerals in solution has been discussed. Using thermodynamic principles, some anticipated solubility behaviors of minerals containing rare earth elements (REEs) using three different acids, hydrochloric, nitric, and sulfuric acids have been presented and discussed to illustrate significant roles of various variables on the solubility of solids. Due to different anions involved with various acids, the extents of leaching of REEs are significantly different. In some cases, strong precipitation of REEs with some of these anions causes an adverse effect on the solubility of these elements. It has been found that sulfate ion has the most pronounced effect on the solubility compared to nitrate and chloride, in which the latter two acids exhibited almost identical results.

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