

EFFECT OF MINERALOGY ON REDUCTIVE BIOLEACHING AND CHEMICAL LEACHING OF COBALT FROM BRAZILIAN LIMONITIC LATERITES

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Fe-rich laterites may contain significant amounts of nickel and cobalt, but efficient extraction of these metals from such ores is still a challenge. In this study, four samples of Fe-rich laterite ores originating from the Barro Alto mine in Brazil were subjected to detailed mineralogical examination followed by reductive bioleaching and chemical leaching tests. Target metal in the leaching experiments was cobalt. Correlations between ore mineralogy, reaction chemistry and leach residue mineralogy were evaluated. Reductive bioleaching experiments were conducted in bioreactors under aerobic conditions with the sulfur-oxidizing acidophilic bacteria *Acidithiobacillus thiooxidans* and *Acidithiobacillus caldus*, and under anaerobic conditions with *Acidithiobacillus ferrooxidans*. Chemical leaching tests were performed with different concentrations of sulfuric acid and hydrochloric acid without reducing agents, and in 5 % sulfuric acid with ferrous iron as a reducing agent. Although samples originated from the same mine, they behaved differently during leaching tests. Results of the leaching tests depended on the mineralogy of the ore. Additional factors such as surface area and particle size were considered as well.