

Abstract

The recovery of cobalt from low grade copper-cobalt heterogenite oxide ores has been the focus of a great deal of research in the recent years. The recovery of cobalt from copper-cobalt oxide ore leach liquor using solvent extraction was investigated in this work. The copper cobalt oxide ore was first leached with sulphuric acid in the presence of a reducing agent namely sodium metabisulphate. The copper and iron were subsequently removed from the solution using hydroxide precipitation. Solvent extraction of cobalt from the resultant copper and iron treated solution was undertaken using Cyanex 272 in Shellsol 2325. Parameters affecting the extraction of cobalt, such as, pH, O/A ratio, temperature, and Co(II) concentration, were investigated. Results show that the extraction rate of cobalt depends on the O/A ratio and possibly the effect of chelation at certain pH ranges. An O/A ratio of 3:1 gave the highest extraction of 73.50% at a pH of 6 and a temperature of 35°C. A negative effect of cobalt extraction was found at pH of 4 (55.04%) and pH of 5 (60.55%) respectively. Complete stripping of the metal-loaded organic was achieved at 100g/L sulphuric acid. It is concluded that the extraction of Co(II) with Cyanex 272 increases with higher equilibrium pH and high O/A phase ratio while stripping of cobalt is done at a higher acid concentration.

Keywords: Solvent Extraction, copper–cobalt ores, CYANEX® 272, Shellsol, 2325,
