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The solvent extraction separation of molybdenum and copper from acid leach residual solution of Chilean molybdenite concentrate

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Abstract

A procedure for recovery and separation of molybdenum (VI) and copper (II) from acid leaching residual solution of Chilean molybdenite concentrate by solvent extraction is studied. The process for the recovery of metals was carried out in three stages:

1. 1) Leaching of molybdenite concentrate with nitric acid produced â€œin situâ€ by reaction of sodium nitrate and sulfuric acid. The dissolution process at 80Â°C was effective, yielding a solid phase constituted mainly of MoO_3 and a residual solution.

2. 2) From this solution, molybdenum was extracted with PC-88A, a non-specific

2. 2) From this solution, molybdenum was extracted with PC-88A, a non-specific alkylphosphonic extractant. It was determined that the extraction is highly efficient around pH 0.8, since cationic species of Mo(VI), feasible to be extracted by PC-88A, are predominant in such pH region. No co-extraction of others metals was observed at the pH of molybdenum recovery. This metal was stripped by ammonia to give an enriched aqueous phase containing 36 g/L.

3. 3) Copper may then be effectively extracted from the resulting molybdenum extraction raffinate with LIX-864, a commercial chelation hydroxy oxime extractant. An optimum pH of 1.9 was determined for copper extraction. From loaded solvent, this metal is easily stripped with copper-containing concentrate sulfuric acid solutions to give a pregnant solution suitable for final recovery of metal by electrolysis.

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Keywords

Molybdenum; copper; solvent extraction; extractive metallurgy; molybdenite; leaching

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