

TECHNOLOGY FOR RHENIUM RECOVERY FROM SOLUTIONS WITH EXTREMELY LOW CONCENTRATIONS

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A processing technology has been developed for rhenium recovery from process solutions obtained at copper production plants and containing about 0.1 mg/l Re (recycled solutions at ore treatment plants, drainage effluents from tailings ponds, etc.). The said technology is based on rhenium recovery from aqueous solutions using strongly anionic resins, elution of rhenium from resins with organic solutions of tertiary amines and subsequent re-extraction of rhenium from amines with aqueous ammonia solutions.

The tests conducted at a pilot plant (six full-scale process circuits) using actual process solutions of the DzhezkazganTsvetmet Company have indicated that a recovery of 70-80% of rhenium from such solutions can be achieved with concentration rates of 10^3 - 10^4 . Despite the complex composition of the solutions used and the presence of organic impurities (flotation reagents, flocculants, etc.), no degradation of the anion-exchange resin and the amine solution was recorded, while the process itself remained stable.

In the same process, about 40-50% of copper dissolved in the process solutions was recovered as by-product. The bulk of copper readily separates from rhenium at the stage of washing of saturated sorbent with aqueous ammonia solution to remove slimes prior to rhenium elution with amine solution. The final eluate contains 100-200 mg/l copper and 400-600 mg/l rhenium; it can be further processed using conventional solvent-extraction or sorption techniques to produce ammonium perrhenate.