

Extraction of nickel from solutions of heap leaching of ores of Serovsky deposit

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Abstract

In the last decade, there has been a steady downward trend in the price of commercial nickel on the world market. The decline in prices led to the closure of a number of enterprises that produced Nickel from oxidized Nickel ores (ONO) by the method of mine melting due to their loss. For example, in the Urals were closed "Yuzhuralnikel" and "Ufaleinikel". Nickel production in the Urals stopped.

In this regard, the IMET UB RAS conduct research on the heap leaching of ONO Serov deposit. In addition to nickel and cobalt, the iron-free production solutions obtained during the leaching process contain magnesium, manganese and aluminum. The extraction of these valuable components will increase the complexity of ONO processing.

The article deals with two methods of processing of sulfuric acid solutions of heap leaching of oxidized nickel ores: hydrolytic and extraction. Three concentrates were obtained by hydrolytic method. Nickel concentrate contains, wt. % : NiO – 63.16; CoO – 2.79; MnO – 18.35; MgO – 4.24. Aluminum concentrate in the form of Al₂O₃ contains 50 wt. % Al. Magnesium concentrate contains 43 wt. % Mg as Mg (OH)₂.

At pH = 1, nickel and cobalt are selectively extracted from sulfuric acid production solutions with Cyanex 301 extractants in relation to magnesium and manganese. Reextraction of 4 mol/dm³ sulfuric acid obtained primary solutions containing, g/dm³: 2.710 Ni; 0.105 Co.

When using the domestic extractant Hydraxex-59, it was found that in the pH range = 1.3-1.7 nickel and cobalt are also selectively extracted from production solutions, and Mn, Mg and Al are practically not extracted.

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