



FLEXICONE

195105, Санкт-Петербург, ул. Варшавская д. 6/1 , alluvialpacific@hotmail.com тел. +79650755923 , www.flexicone.net

New Leach-BETA reagent for intensifying the processes of halogen and cyanide leaching - speeds up the process several times and increases gold recovery. Can also be used to intensify the oxidation of sulfide ores and concentrates

US\$9.90/kg

Advantages

Safe product for transportation, storage and use

Leach BETA is a technical grade powder catalyst designed for intensive leaching of ores and concentrates

Can also be used to intensify the oxidation of sulfide ores and concentrates. In this case, iron and non-ferrous metals are extracted into solution. At the leaching stage, the consumption of the leaching reagent is reduced and gold recovery is increased.

A recovery of 99.9% was achieved. from concentrates

Periodic addition of powder reagent is very simple and effective.

Technological process

The rate of reaction depends mainly on the concentration of the reagent and temperature. In most cases, leaching time is reduced by 2-3 times. Concentrate containing 2% gold should be leached at a solid to liquid ratio of 1:3 for iodine-iodide solutions, and 1:5 for cyanide solutions to prevent saturation of the solution with gold.

Consumption of Leach BETA 25g per kilogram of concentrate.

Example 1(Intensive cyanidation)

A kilogram of concentrate is loaded into a bottle-type reactor, with the addition of:

10 g sodium hydroxide;

5 liters of water;

65 g sodium cyanide;

25 g Leach BETA

In the bottle test, the solution is withdrawn hourly until the gold concentration stabilizes. The residue is thoroughly washed with warm salt water and the procedure is repeated. If a significant amount of gold is recovered from the second cycle, it is likely that there was not enough cyanide in the first cycle or the solution became saturated with sodium aurocyanide.

Example 2 (Iodine-iodide leaching)

1. Grind the ore to a size of 70 microns
2. To speed up the leaching process, it is recommended to pass the ore through a concentrator to isolate a large fraction of gold
3. We send the head of the concentrate for smelting, the tails for leaching
4. For complete extraction before leaching, sulfide and refractory ores are opened by roasting or chemically in a reactor; without oxidation of refractory ores, extraction can be 50%-80%.
5. To oxidize the ore, we prepare an oxidizing solution: based on the ratio of ore to solution 1:2 by weight. The oxidation process and reagent are selected according to the technological scheme based on the composition of the ore. (Information provided additionally)
6. Prepare a leaching solution: based on the ratio of ore to solution 1: 1.5 by weight, for this we prepare a new solution of iodine-iodide KI3 or use the last clarified washing filtrate after leaching, reagent 10% Potassium Iodide KI and 1% iodine / iodine regenerator Leach BETA. If using the previous KI filtrate, 1% iodine/Leach BETA iodine regenerator must be added. When the complex is supplied with an electrolyzer, iodine-iodide regeneration occurs in a flow electrolyzer,

The pH of the solution is regulated by the addition of acid (electrolyte H2SO4) or alkali (KOH),

7. The finished solution is loaded into the reactor. The filtrate is returned from the collection to the receiver in recirculation mode. The turbo drive (if included) is turned on periodically once every 30 minutes until the pulp is completely liquefied (1-2 minutes). The leaching process lasts from 60 to 240 minutes (the leaching time and the number of cycles are determined by trial and depends on the size of the gold particles and the type of ore. When leaching concentrates with a high gold content, the concentration of the solution increases.

The acidity of the solution is neutral (PH7), the electrolyzer current is 5-10A, the temperature is 20-40 degrees C

If the ore contains non-ferrous metals (copper, zinc, lead), the addition of additional reagents may be required. (The process is controlled by the color of the solution, which should be brown. With a yellow solution, gold precipitates. It is necessary to adjust the acidity of the solution PH to 7 and add Leach BETA

8. We control the gold content in the solution using an indicator reagent (supplied additionally) based on the color of the solution. The minimum gold content in the solution to start indication is 0.5 mg of gold per 1 liter of solution.

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12. The filtrate is supplied for gold precipitation with the addition of a gold precipitator (1g of gold precipitator per 1g of gold). If there are non-ferrous metals in the solution, the amount of gold precipitator is controlled by eV Tester (less than 0)

13. The gold-free solution is supplied to iodide regeneration with the addition of sulfuric acid and the Leach BETA iodine regenerator or into a separate two-chamber electrolyzer for iodide regeneration.

14. If desired, when several precious metals are present, they can be deposited simultaneously or separately. A solution containing gold, silver, dissolved in an electrolyzer and filtered from the base material, is made alkaline (pH about 8); and all the gold, silver and in the filtrate are simultaneously precipitated by the addition of a gold precipitator.

15. The precipitated gold cake is washed and ready to be plated into doré or re-refined by the aqua regia process to obtain gold with a purity of 99.9%.

16.

Examples of using

1. Rock processing

Quartz sulphide arsenic ore with a gold content of 50 g/t is crushed to a size of 0.1 mm.

The ground ore is processed through a Flexicone centrifugal concentrator to recover free gold and silver. Concentrate with a gold/silver content above 5% can be directly smelted. For better collector melting with lower content, we recommend the Flexicone induction furnace with ultrasonic depositing in the crucible.

Tailings from the concentrate are processed in the FLR14 leach reactor

An aqueous 8% solution of a halogen reagent and crushed quartz ore are poured into the apparatus. The T:W ratio is 1:1. The resulting pulp is processed for 180 minutes in electrolyzer mode to extract gold from the rock. To intensify the process, it is recommended to stir the pulp for 1-2 minutes with a stirrer every 30 minutes.

Gold and silver are leached from ore. The pulp is then filtered. The cake is washed with water. The resulting clarified solution is mixed with the main filtrate for chemical precipitation of gold or sent for leaching of the ore of the next material. For chemical precipitation, the filtrate is poured into a container and brought to pH 12.8 by adding caustic alkali. Heat to boiling point and add 3 g of Leach BETA per liter of solution. Next, the gold settles for an hour. The gold residue after drying is subjected to smelting. The recovery rate of gold and silver is up to 99.8%

2. Rock analysis for gold content

A 1 kg sample of finely ground ore with a gold content of 0.1 g/ton is mixed with 0.2 liter of a 10% solution of iodine-iodide reagent. The resulting pulp is processed for 180 minutes in electrolyzer mode for rock analysis and with electrodes for analysis. To intensify the process, it is recommended to stir the pulp for 1-2 minutes every 30 minutes. The gold content in the solution is controlled by an indicator reagent (supplied additionally) based on the color of the solution. The minimum gold content in the solution to start indication is 0.5 mg of gold per 1 liter of solution.

Analysis accuracy +/- 20%

3. Extracting precious metals from electronic waste

The material received for processing was a product obtained by mechanical enrichment of electronic scrap through the operations of crushing in a closed cycle, screening, air classification with subsequent separation of the metal fraction by magnetic and electrostatic separation in an amount of 1 kg, containing (%) Au 0.52 ; Ag 2.20; Sn 15.9; Pb 7.48; Zn 0.36; Cu 27.60; Ni 0.20; Fe 5.00.

The extraction of tin, lead, aluminum and part of the zinc from scrap was carried out by electrochemical dissolution in 10-20% alkali solutions, with anodic polarization of scrap. Leaching was carried out in an electrolyzer with a stainless steel anode, into which scrap was loaded, and a cylindrical cathode made of the same material, with constant stirring and removal of excess heat. The process was constantly monitored by changes in scrap weight. At a current density of 300 A/m², current strength 40A, solid to liquid ratio (S:L) = 3 and (room) temperature 50-70, the process ends in 6 hours, while the degree of extraction of tin, lead and aluminum and zinc into the solution were respectively (c) 92, 80, 65, 55 (the concentration of elements in the solution is respectively 47.38; 20.2; 2.11; 0.67 g/l). At the same time, tin-lead powder was deposited on the cathode, gradually falling to the bottom of the electrolyzer. Current efficiency at 18%

After washing the leached scrap from alkali, its weight was 756 g. The electrolyte was filtered from tin-lead powder and reused. As aluminum and zinc accumulate in the electrolyte, part of the solution is removed from the process and cleared of them by precipitating sodium aluminate by cooling the solution to 16-18 degrees and subsequent cementation of zinc on iron filings. The purified electrolyte is returned to the head of the process.

Purification of gold-containing electronic scrap from copper and alkali-insoluble non-ferrous metals was carried out by electrochemical leaching of these elements into a copper-ammonia etching solution or a composition based on monoethanolamine with simultaneous separation of powdered copper at the cathode. The process was carried out in the previously described electrolyzer with constant monitoring of the weight loss of the loaded scrap. At a current density of 200 A/m², T:L 2, constant air blowing and room temperature, the process ends in 6 hours, while the degree of extraction of copper, nickel and silver into the solution was (c) 98, 90, 73, respectively. Residual copper content in solution after electrolysis 10 g/l. After washing the leached scrap from the copper-ammonia etching solution, its weight was 468 g.

The electrolyte was filtered from copper powder and reused. As silver and nickel accumulate in the electrolyte, part of the solution is removed from the process and after ammonia is distilled off, silver chloride is released from it and nickel is cemented. The solution is further strengthened with ammonium salt, ammonia and returned to the head of the process.

Cleaning scrap from iron was carried out by sulfuric acid leaching in the presence of an oxidizing agent, followed by precipitation of iron hydroxide.

The material (scrap) prepared in this way was processed in accordance with example 1.

Attention

A full description (Clause 9, 10, 11, 16) is provided with the purchase of the reactor