Copper Minerals/Scrap Treatment

ECUPREX® Process

Title: Copper Production from Leaching Solutions with an Innovative Process Competitive to the Traditional SX-EW

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Abstract: Today the copper production from direct leaching of oxidised ores with SX – EW technology is about 15 % of the total primary world wide output. SX – EW is a well consolidated process with a operating cost, from copper sulphate solution to cathodes, in the range of 16 ÷ 20 cents/lb of copper for small and medium plants depending on the plant size and local conditions.
This technology, of course, presents some drawback that affect the operating cost and environmental concerns.
Engitec and Paques Bio Systems have developed a new process that avoids the solvent extraction step and runs the copper E.W. at a lower cell voltage because of the depolarization of the anodic reaction. The consequence of this new concept is that the direct operating cost value is in the range of 10 ÷ 12 cents/lb of copper.

This new process is composed by the following steps:

- Selective precipitation of copper from leaching solution by biogenic H_2S obtaining CuS and regenerating acid
- Leaching of the CuS with a ferric fluoborate solution obtaining the Cu dissolution and producing elemental sulphur to be recycled back to the H_2S biogeneration
- Electrowinning of copper fluoborate solution in a diaphragm cell with thw ECUPREX® Process producing Cu cathodes and regenerating the ferric fluoborate solution to be recycled back to the leaching step
- Biogeneration of H_2S from elemental sulphur generated during the leaching step. The nutrient for the anaerobic bacteria will be selected in a wide range of organic substances and/or industrial by-products containing carbon and hydrogen.

This paper describes all the steps of the process with particaular reference to the biological H2S production technology.
It is also discussed the capability of the ECUPREX® Process in the treatment of copper sulphide concentrates and copper matte.