



Enhanced recovery of oxidised base and precious metal bearing minerals

Oxidised and surface oxidised minerals containing base metals such as copper and nickel often float poorly during mineral processing to create a concentrate from which the metal can be recovered downstream.

The production and subsequent use of base and precious metals from their associated minerals plays an important role in the technological and economic well-being of society. In the separation processes commonly employed to recover these base and precious metal minerals, oxidised surfaces significantly impact upon the efficacy of such processes. These oxidised mineral surfaces most commonly arise through the oxidation processes that occur during the weathering of a sulfidic ore-body, however, they can also occur during the mining and processing of that ore-body, forming both oxidised and surface oxidised minerals.

This invention is designed to recover 'difficult to sulphidise' base metal minerals including surface oxidised base metal sulphides. The procedure has been demonstrated for surface oxidised base metal sulphides, particularly pentlandite. It is likely that a range of other minerals that normally require 'heavy' sulphidising or are difficult to sulphidise, such as the various forms of heterogeneite and chrysocolla, would be expected to respond favourably to this approach.

Benefits

- Increased base metal mineral recovery from oxidised and surface oxidised minerals that are difficult to recover during conventional floatation.

Applications

- Recovery of oxidised and surface oxidised base metal ores, such as copper and nickel

Technical description

The oxidation of sulfide mineral surfaces in a Nkomati sample significantly affected their floatability, particularly for pentlandite and pyrrhotite. These minerals were readily oxidised and subsequently displayed a poor floatation response. Chalcopyrite retained a reasonable degree of floatability and thus had not been heavily oxidised. Sulfidisation restored the floatability of the three sulfide minerals, although not to the same degree.

Keywords:

Sulphidisation, tailings, floatation, mineral ore, metal recovery

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