

METTLER TOLEDO APPLICATION NOTE

Copper Flotation

BACKGROUND

Copper ore can be separated from crude ore by means of a flotation process that takes advantage of the physical (as opposed to chemical) properties of small copper ore particles. To maximize the yield of copper, pH control is necessary in the flotation tanks.

THE PROCESS

Crushed ore, along with water and a lime slurry, is fed into a ball mill. This rotating drum contains steel balls that further crush the ore to a fine powder. When the ore/ lime slurry emerges from the mill, it is fed to a rake classifier. Particles that are too large to pass from the classifier are returned to the mill, while the overflow is discharged to flotation cells.

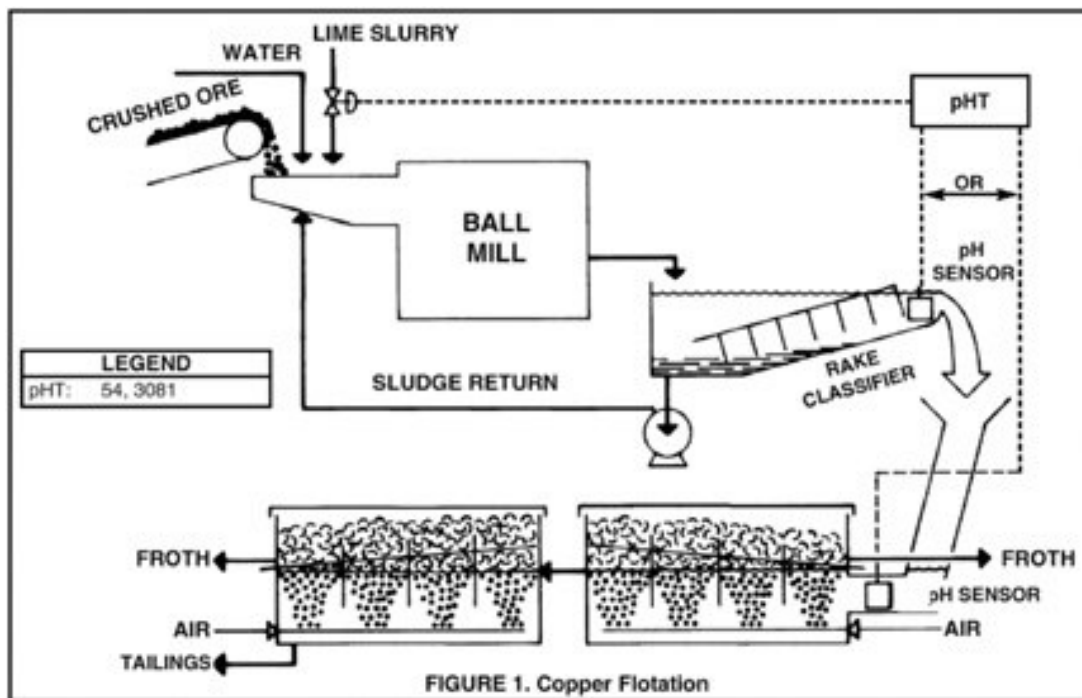
Air is injected into the flotation cells, creating a froth. Copper ore particles, due to their relatively lightweight, become a part of this froth, while heavier particles such as iron ore do not. The copper rich froth is then separated from the solution for further processing. (Figure 1)

The condition of the froth is directly dependent on pH. The flow rate of lime slurry is therefore regulated to keep the pH within the acceptable range. If pH is too low, iron will be entrapped as well as copper, decreasing the value of the copper ultimately recovered. If too much lime is added, the result is a dilute froth that requires additional concentration in later stages, increasing operating costs and wasting lime.

INSTRUMENTATION

The InPro[®] 4500VP Solid Polymer pH Electrode is especially recommended for control in the pH 12.5 range that is characteristic of lime slurries. This electrode features the Xerolyt[®] solid polymer reference system which replaces the ceramic diaphragm of traditional electrodes with an annular junction, minimizing contamination problems and ensuring accurate measurements. The electrode is rugged and highly resistant to coating, resulting in reduced maintenance and process downtime.

The analyzer of choice is the Model 2100 pH analyzer.



PRODUCTS

2100 pH Analyzer

- Detachable front panel and plug-in terminals for ease of installation
- All functions accessible through the keypad for increased ease of use
- Continuous sensor and transmitter diagnostics to monitor performance
- FM certification for Class I, Div 1 & 2 Environments and CSA General Purpose Approval
- 3 year warranty

InPro[®] 4500VP Solid Polymer pH Electrode

- Patented Xerolyt[®] solid polymer reference system maintains a stable potential for accurate and repeatable pH measurement and low maintenance
- Open junction eliminates reference clogging and extends sensor life
- High pressure resistance eliminates requirement for pressurizable housing
- Xerolyt solid polymer is particularly suitable for use in emulsions, suspensions, heavily contaminated or sulfide-containing media, and solutions with a high concentration of suspended solids