



## Flotation Process and Techniques Involved in Iron Ore Slurry

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### DESCRIPTION

The process of froth flotation is a best example for applied surface chemistry. It is extensively used in the mining, mineral, metallurgical, and chemical industries for the separation and selective concentration of individual minerals and other solids. The substances are concentrated raw materials for producing appropriate metals and chemicals. The importance of flotation in technology is made selective and versatile and to the economy of process. This is a process for selectively separating hydrophobic materials from hydrophilic. It is also used in mineral processing, paper recycling and waste-water treatment industries.

It plays an indispensable role in the mineral beneficiation process; flotation is susceptible to a number of factors during the process, including grinding fineness, slurry concentration, pulp pH, pharmaceutical system, aeration and agitation, flotation time, water quality and other process factors.

It has been used in coal and mineral cleaning operation for a long time and based upon the difference in densities of materials. Normally, the air bubbles are forced into the tank using external aerators or agitators, these tiny bubbles attaches to the surface of algal cells and by buoyancy, the cells are risen up in the tank. Although the addition of chemicals and subsequent changes in pH can influence the separation by froth flotation, it is one of the expensive methods of algal biomass separation from treated by water and rarely commercialized. There is an option of combining froth flotation with flocculation.

It is mainly operated under two common techniques:

1. Direct floatation technique is the method, at which the mineral sticks to the air bubble and the remaining gangue settles down at the bottom.
2. Reverse floatation technique is the method, at which the gangue sticks to the air bubble and ore particles settle down in the bottom.

Typically there are 3 different types of chemicals that are used in the froth flotation process: collector, frother, and modifier. First,

the "Collector" is added to the iron ore slurry for selectively coat the iron oxide particles, makes the surface hydrophobic. The slurry then goes to a flotation cell, where air bubbles is generated using an impeller and aerator. At this step, the "Frother" process (for example, fuel oil) is added to the ore slurry to form stable froth and air bubbles. The Iron oxide particles stick to the air bubbles and float.

The floated and concentrated iron ore slurry is then skimmed from the surface of the water and removed by using a filter press. If the desired iron content is not achieved, then process is again repeated. A "Modifier" process is added in some cases in order to enhance the performance of the collector process. The most important chemical that must always be present is frother. Without the generation of stable air bubbles, hydrophobic particles will not have anything to attach and will not separate from the bulk solution.

It is extensively used for the separation of finely divided solids. The separation depends upon the differences in the surface properties of materials. The particles are suspended by an aerated liquid (usually water), and air bubbles adhere preferentially to the particles of one component and bring them to the surface. The Frothing agents are used, so that the separated materials are held on the surface as froth and it can be removed. It is extensively used for separation technique, which has a wide range of applications in the minerals processing industries and other industries. It can be used for particles in the size range from 50 to 400  $\mu\text{m}$ .

### CONCLUSION

Froth flotation is the main key unit process for the treatment of iron ores for decades to come with the over-arching challenge which is described as being the need to modify and improve existing procedures and processing conditions. So, as to maintain an acceptable iron grade-recovery the response in the face of ores and feedstock will be finer, more complex, lower in grade, more goethitic in nature, and higher in deleterious impurities.

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