

itü



OXIDE FLOTATION

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1. General Information

Flotation method is used for ores with lower content that cannot be enriched by physical methods. In flotation processes, it is generally preferred to float the mineral with a low amount. If the precious mineral is floated and the gangue remain in the sinking part, this process is called as direct flotation. If the gangue mineral is floated and the precious mineral remain in the cell, then this process is called as reverse flotation. For industrial raw materials, which contains iron oxides, reverse flotation is used constantly. For example, quartz minerals contains iron minerals in different ratios. Quartz is one of the main raw material for glass industry, but there is a limit for the iron content inside the quartz concentrate. Therefore, iron oxide minerals must be removed from quartz with reverse flotation method.

Most of the minerals contain oxygen atom in their chemical structure. Oxygenated minerals include oxide, hydroxide, carbonate, phosphate, silicate, sulphate, wolframate, chromate, molybdate, manganate, uranate and vanadates and some examples for this kind of minerals are barite, magnesite, phosphate, chromite, quartz and iron oxides Oxides are metal cation-oxygen anion compounds. In other compounds, oxygen is found in the structure of a polyatomic anion. Oxygenated minerals can often be floated with fatty acids and soaps. In this flotation, since gangue minerals are also other oxygenated minerals, precautions should be taken to prevent them from floating. A proper pH adjustment and sometimes a suitable activator may be required. In the flotation of oxygenated minerals, besides fatty acids, detergent type reagents such as sulfonate and cationic reagents such as amine are also used. In this type of flotation, the hardness of the water and the slime are also important and should be controlled

2. Purpose of Experiment

The removal of some iron oxide minerals from glass sand containing high iron oxide content by sulfonate type collectors for using in glass and ceramic industry.

3. Experimental Procedure

Sample: The glass sand below 0,2 mm, containing high iron oxide content and obtained from ESAN A.Ş.

Used material-device: Flotation machine, balloon jock, spray bottle, stopwatch, measure, pH meter.

Method: Iron oxides from glass sand will be floated by collector after the pH adjustment and conditioning time.

- Sample: 500 gr + 2,5 L of cell
- Collector: The mixture of R-801 and R-825
- Conditioning time: 2+2 min
- pH adjustment: %10 of H₂SO₄ solution (3-3,5)
- Flotation time: 2+2 min
- Stirring Speed: 1400 rpm

Groups	R-801 (g/t)		R-825 (g/t)	
	1st stage	2nd stage	1st stage	2nd stage
1	50	50	25	25
2	100	100	50	50
3	200	200	100	100
4	300	300	150	150
5	400	400	20	200

4. Requests

1. Give some brief information about oxide flotation and reverse flotation and write the application field of oxide flotation.
2. What are the properties of the reagents used in oxide flotation and what are their effects on minerals?
3. Write the purpose and steps of experiments. Make the calculations for reagents.
4. Evaluate the results of experiment and what changes can be made to achieve better results, please comment.
5. Draw the flowsheets of one plant in Turkey or world where the oxide flotation is applied. Give some informations about the reagents using in that plant. If you can not find the information about reagents on internet, comment on what kind of reagents can be used, taking into account the minerals.
6. Evaluate the applicability of magnetic separation before flotation in terms of mineral's structure.