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CONCENTRATION PROCESS

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2 Claims. (Cl. 209—166)

This invention relates to the concentration of ores and its primary object is to provide an efficacious flotation treatment for separating values from soluble ores in a process requiring the intermixtures of the ore with water or other liquid.

An essentiality of the flotation process is that ore in a finely divided condition be suspended in a liquid, usually water, and subjected to agitation and/or aeration in the presence of an agent which has a preferential affinity for one or more of the metalliferous constituents of the ore, over the baser matter, thereby inducing an elevation of such constituent or constituents to the surface of the liquid body where it collects in a froth, which is subsequently removed by overflow.

The flotation process above described has heretofore been applied to substantially non-soluble ores, as the values sought to be recovered in the froth were held in suspension in the liquid, with which the ore is intermixed, in a solid condition.

However, as disclosed in the co-pending application of Leslie D. Anderson, Serial No. 748,477, filed October 16, 1934 for Process for concentrating ores, and my co-pending applications, Serial Nos. 755,576 and 755,577, filed December 1, 1934, and respectively entitled Temperature control in a flotation process, and Flotation process, various methods of applying the flotation treatment to soluble minerals, such as sylvinite ores, have been disclosed.

For example, it has been found that in the treatment of sylvinite ores, containing both potassium chloride (sylvite) and sodium chloride (halite), excellent results can be obtained by a flotation treatment of a saturated brine solution of the mineral.

While the invention as hereinafter to be described may be applied in the treatment of various soluble ores, it is more particularly adapted for the separation in a saturated brine solution, of potassium chloride constituents from sodium chloride constituents of sylvinite ore by subjecting the said constituents to the action of a reagent having a preferential affinity for one of said constituents, and it is in this connection that the steps involved in the process according to the invention will now be described.

The ore with its soluble matter, in a finely divided condition, is intermixed with a saturated solution of the same ore, or more particularly, of its valuable constituents and subjected to the action of a reagent which in the presence of agitation and/or aeration selectively carries to the surface as a froth to be subsequently removed by overflow, one of the valuable constituents, which has remained in a solid state owing to the saturated condition of the liquid.

Ores containing halite and sylvite have been found to be particularly amenable to such treatment and sulphate or sulphonate derivatives of lauric acid or lauryl alcohol are the flotation reagents of the process. Specific compositions which have proved particularly efficacious as the reagent of the treatment are sodium lauryl sulphate (or sulphonate), a sodium salt of the half sulphuric ester of primary lauryl alcohol, or an alkali salt of a sulphonated alcohol.

All the foregoing compositions serve to produce frothing, collection and promotion, as well as selection in the flotation treatment of ores of the above-described character.

The pulp is subjected to selective flotation of the potassium chloride constituents by the use of the reagent, which may be introduced into the same, prior to the flotation treatment, or it may be introduced directly into the flotation treatment and mixed by the agitative action of the process.

As an example of the application of the process, potassium chloride and sodium chloride constituents of an ore, when introduced into a saturated solution of potassium chloride, and subjected to the action of sodium lauryl sulphate in a froth flotation treatment, will be cleanly separated with potassium chloride values carried to the surface and collected in a froth, where they are readily removed by overflow. The present application is intended to cover the specific features hereinbefore discussed and the broad concept of the flotation treatment and the use of equivalent reagent materials which have not been made the subjects matter of claims in the present application have been described and claimed in my co-pending application Serial No. 38,316, filed August 28, 1935, for Flotation process for treating sylvinite ores and products obtained thereby.

Changes and modifications may be availed of within the spirit and scope of the invention as defined in the hereunto appended claims.

What I claim and desire to secure by Letters Patent is:

1. A process of concentrating ores containing potassium chloride and sodium chloride which comprises subjecting the ore pulp containing potassium chloride and sodium chloride to a froth flotation treatment in the presence of sodium lauryl sulphate.

2. A process of concentrating ores containing potassium chloride and sodium chloride which comprises subjecting the ore pulp containing potassium chloride and sodium chloride to a froth flotation treatment in the presence of a sodium salt of the half sulphuric ester of primary lauryl alcohol.

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