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MANUFACTURE OF PERBORATES.

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To all whom it may concern:

Be it known that I, JOHANN KONRAD LANGHARD, a citizen of Switzerland, residing at Fredriksstad, Norway, have invented certain new and useful Improvements in the Manufacture of Perborates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object an improved process for the manufacture of perborates by electrolysis. In the known processes for the electrolytic production of perborates it is found that in spite of the fact, that the conditions necessary to obtain a satisfactory formation of perborate are apparently complied with, the output decreases and may reach a point at which it is impossible to obtain solid perborate. Careful experiments which I have made have led to the conclusion that the unsatisfactory results referred to are due to the presence of catalytically acting substances, especially iron compounds. Based upon these considerations the correct course would seem to be to remove the said injurious substances.

This result might possibly be attained electrolytically by precipitating the injurious constituents as metals on the cathode.

I have made a plurality of experiments along these lines, however without attaining the desired effect.

The present invention is based upon the surprising observation that the decrease in output referred to above does not take place when a cyanogen compound is added to the electrolyte, and in accordance with this observation the present invention has for its object to subject the solution in question to electrolysis in the presence of a cyanogen compound, such as for instance sodium cyanid.

When in the manufacture of sodium perborate by electrolysis a quite small quantity of sodium cyanid is added to the electrolyzed solution, and the solution is again subjected to electrolysis, the reduced current output will rapidly increase, so that it may reach a value of for instance about 45 per cent. in the proximity of the point of saturation as regards the sodium perborate.

The quantity of cyanid to be added to the bath varies within wide limits in accordance with the conditions in each instance. In the case of sodium cyanid the effect will usually begin when the added quantity is about 0.3 g. of NaCN to the liter, and the addition may for instance be increased as desired, for instance to about 4 g. to the liter.

An explanation of the surprising effect of the cyanogen compound may consist therein that the catalytically acting substances are converted into cyanogen compounds, from which the metal is easily separated cathodically.

In carrying the process into effect the cathod proper of the electrolyzer can be made use of, or one or more auxiliary cathodes may be arranged. The said auxiliary cathodes may have a larger surface than the cathodes proper, so that a more rapid and complete precipitation is attained.

The purification of the electrolyte may also be effected in a separate cell.

During the operation the cyanid will be gradually decomposed, so that additional quantities of the cyanogen compound must be added. Instead of adding one single cyanogen compound, a mixture of such compounds may be used.

Example.

To a solution containing between 100 and 120 g. of calcined soda and between 30 and 40 g. of borax to the liter is added a quantity of sodium cyanid of between 0.5 and 3 g. The solution is electrolyzed at a temperature of from 12–14 C. with a current density of about 20 amperes per square decimeter until the saturation point of perborate is nearly attained.

The electrolysis is then interrupted. The solution is introduced into another vessel where sodium perborate is caused to crystallize by means of cooling or by other suitable means. When the crystallization is finished, the mother liquor is regenerated and prepared for repeated electrolyzation. Additional quantities of cyanid are added to the electrolyte to replace that decomposed.

Claims.

1. Process for the production of perborate by electrolysis of a borate solution comprising the steps of subjecting the borate solution to electrolysis in the presence of a cyanogen compound.

2. Process for the production of perborate according to claim 1, in which sodium cyanid is added to the solution before electrolysis.

3. Process according to claim 1, in which the borate solution is subjected to electrolysis, and increasing the speed of reaction by auxiliary cathode action.

4. Process according to claim 1 in which the solution is subjected to electrolysis in the presence of a cyanogen compound in a separate electrolyzer previously to the main electrolyzation operation for the formation of perborate.

5. Process for the production of perborates by the electrolysis of borate solutions containing impurities, in the presence of a compound capable of converting said impurities into compounds whose cathion is capable of cathode precipitation during the electroylsis.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

JOHANN KONRAD LANGHARD.

Witnesses:

NAPH. A. PEDEACHAN,

ROBERT A. FRAZIER.