

UNITED STATES PATENT OFFICE

2,198,045

PROCESS FOR THE ELECTROLYSIS OF
SULPHATE SOLUTIONS

Robert Suchy and Georg Messner, Bitterfeld,
Germany, assignors to I. G. Farbenindustrie
Aktiengesellschaft, Frankfurt - on - the - Main,
Germany

No Drawing. Application January 27, 1937, Se-
rial No. 122,614. In Germany February 20,
1936

4 Claims. (Cl. 204—9)

This invention relates to a process for the electrolysis of sulphate solutions.

The lead anodes used in the electrolysis of sulphate solutions, more particularly alkali metal sulphate solutions, have the disadvantage that the surface layer of the anode is gradually removed by anodic oxidation as a result of which lead may be deposited on the cathode and may contaminate the metals separated out at the cathode. In order to obviate this drawback it has been proposed to use alloys of lead containing silver in amounts below the eutectic concentration of about 2.5%, to which alloys small quantities of arsenic could also be added, if desired, for the purpose of hardening the lead.

When carrying out the electrolysis of alkali metal sulphate solutions for the purpose of obtaining alkaline lyes and sulphuric acid it has however been found that both anodes of pure lead and anodes containing a small proportion of silver, undergo a constant decrease in weight caused by the lead peroxide formed on the anode during the electrolysis, flaking off. In cases where the anodes consist of a lead-silver alloy containing arsenic in addition, the anodes undergo an increase in weight in the course of time, the lead peroxide forming on their surface accumulating to form thick solid layers. Ultimately these layers become so thick that any slight mechanical action, even of the oxygen bubbles generated at the anode, causes them to fall off.

It has now been ascertained in accordance with the present invention, that wear of lead anodes by the formation of lead peroxide during the electrolysis of alkali sulphates can be practically completely suppressed if the silver content of the lead be raised above the eutectic concentration of 2.5%, and advantageously up to about 7.5%, and if at the same time care be taken, by cooling the anode in a manner known per se, to ensure that the temperature of the anode is always kept below about 50° C. during the electrolysis. By operating in this manner a completely colourless, clear anolyte is obtained.

Minor percentages of arsenic not exceeding the silver content of the alloy may be added to the lead-silver alloys the use of which is contemplated by the present invention, for the purpose of hardening the lead. By way of example, an alloy consisting of 96% of lead, 3% of silver and

1% of arsenic is suitable for the purpose of the present invention.

We claim:

1. A process for the electrolysis of aqueous alkali sulphate solutions, which comprises conducting the electrolysis with an anode consisting essentially of a lead-silver alloy in which lead is predominant and in which the percentage of silver is between about 2.5 and about 7.5% by weight of the alloy, while maintaining the temperature of the anode below 50° C. during the electrolysis whereby wear of the anodes by the formation of lead peroxide during the electrolysis is practically completely suppressed.

2. A process for the electrolysis of aqueous alkali sulphate solutions, which comprises conducting the electrolysis with an anode consisting essentially of a lead-silver alloy in which lead is predominant and in which the percentage of silver amounts to about 7.5% by weight, while maintaining the temperature of the anode below 50° C. during the electrolysis whereby wear of the anodes by the formation of lead peroxide during the electrolysis is practically completely suppressed.

3. A process for the electrolysis of aqueous alkali sulphate solutions, which comprises conducting the electrolysis with an anode consisting essentially of a lead-silver alloy containing a predominant percentage of lead, a minor percentage ranging between about 2.5 and about 7.5% by weight of the alloy forming the anode, of silver, and a yet minor percentage of arsenic, while maintaining the temperature of the anode below 50° C. during the electrolysis whereby wear of the anodes by the formation of lead peroxide during the electrolysis is practically completely suppressed.

4. A process for the electrolysis of aqueous alkali sulphate solutions, which comprises conducting the electrolysis with an anode consisting of about 3% of silver and about 1% of arsenic, the balance being lead, while maintaining the temperature of the anode below 50° C. during the electrolysis whereby wear of the anodes by the formation of lead peroxide during the electrolysis is practically completely suppressed.

ROBERT SUCHY.
GEORG MESSNER.