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COMPOSITION FOR AND METHOD OF PURIFYING ELECTROLYTES

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1

The present invention relates to a method of purifying electrolytes. More particularly, it relates to a method of purifying zinc electrolytes and especially to electrolytes as used in the electrolytic method of winning zinc from ores or other materials.

That certain impurities in electrolytes cause great difficulty during the operation of plating by electrical methods, in some cases due to the impurity itself plating and so causing the deposit to be impure and of less value, and in other cases due to the impurity bringing about a lowered efficiency in the plating process, is a fact well known in the arts. Consequently, great pains are taken and much expense is incurred in purifying electrolytes so that the harmful impurities may be removed to a sufficient extent.

In the electrolytic process for the winning of zinc, for example, the impurities cadmium, copper, tin, arsenic, antimony, lead, and other elements, if left in the electrolyte, will deposit along with the zinc in the electrolytic cell and will render the zinc impure so that its value is decreased; other impurities, among which may be mentioned arsenic, antimony, tin, germanium, tellurium, selenium, iron, nickel and cobalt, lower the efficiency of the electrolysis so that more current is used to produce a pound of metal than would be required if these elements were absent, and so their presence greatly increase the expense of the process. Commonly, two and sometimes three processes are used to remove these impurities. The iron, together with part of the copper, arsenic, antimony, tin, germanium, tellurium, selenium, and other metals, is precipitated by treating the electrolyte with zinc oxide, or roasted zinc ore, or lime, while air is blown through the solution. The resulting precipitate is removed by thickeners or filters. The solution is then treated with zinc dust, sometimes along with other reagents such as copper salts, and thereby antimony, arsenic, tellurium, selenium, tin, cobalt, copper, cadmium, and other elements are precipitated and may be removed by filtration. Sometimes a third method is used to remove certain elements, as, for example, sometimes α nitroso-B-naphthol is used to remove cobalt.

Now, in the removal of impurities by means of zinc dust, it is well known in the art that the purifying action of zinc dust is increased if finely divided copper be present; commonly this finely divided copper is formed by precipitating it from the solution to be purified by the zinc dust. Further, the purifying action of the zinc is still further increased if antimony or arsenic be deposited

2

upon it: when zinc dust, together with copper and antimony, is used, the purifying action becomes great enough to precipitate certain metals, of which cobalt is an example, which are very difficult to precipitate otherwise.

We have discovered that indium may be used instead of antimony or arsenic with improved effects.

As an example of the use of our invention, we took a sample of zinc electrolyte which showed the following analysis as to impurities:

	Milligrams per liter
Cobalt	8.4
Arsenic	0.20
Antimony	0.14

We dissolved 0.142 gram metallic indium in sulphuric acid and neutralized the resulting solution with sodium hydroxide. In this solution were dissolved 8 grams of copper sulphate

($CuSO_4.5H_2O$)

This solution was diluted to 300 cc. with water. Two hundred grams of −20+48 mesh zinc dust were added and the whole agitated until the copper and indium were precipitated on the zinc dust.

The zinc dust coated with copper and indium was then packed in a 1-inch copper tube about 12 inches long and held in place with glass wool. Arrangements were made so that the electrolyte could be drawn through this copper tube. The electrolyte was heated to 50° C. and drawn through; the contact time of the electrolyte with the mixture is estimated to have been 1.13 minutes. The issuing solution had the following analysis:

	Milligrams per liter
Cobalt	3.4
Arsenic	0.01
Antimony	0.05

That the indium plays an essential role in the purification was proved by carrying out the same experiment, using zinc dust and copper only, and the same electrolyte.

With zinc dust coated with copper, the issuing solution had the analysis:

	Milligrams per liter
Cobalt	6.3
Arsenic	0.01
Antimony	0.02

It will be observed that in the precipitants above described, including zinc coated with copper and indium, the precipitant in a finely divided

form is held in a porous bed, which has the effect of holding the precipitated impurities in contact with the purifying agent, by which means a degree of improved purification is obtained.

What we claim as our invention is:

1. A purification agent for electrolytes comprising zinc dust coated with indium and copper.

2. In the purification of zinc electrolytes by means of metallic precipitants, the step of contacting the electrolyte with zinc dust coated with copper and indium as the precipitant.

3. A method of purifying zinc electrolytes by means of metallic precipitants comprising passing the electrolyte through a stationary porous mass of finely divided precipitant for the electrolyte comprising zinc dust coated with copper and indium, and maintaining the precipitated impurities in contact with the precipitants while continuing to pass the electrolyte through said mass.

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