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PROCESS FOR THE PRECIPITATION OF COPPER AND FOR THE TREATMENT OF SUBSTANCES CONTAINING COPPER AND NICKEL

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The present invention relates to the precipitation of copper from solutions containing copper by means of nickel, it being immaterial whether the nickel is used in the form of metallic nickel or of alloys containing nickel, providing that the precipitation of the copper by the nickel takes place at temperatures which are above 100° C.

The separation of copper from solutions containing copper by means of nickel is in itself known. It takes place, however, too slowly at temperatures below 100° C. At temperatures of more than 100° C. however, the conversion takes place rapidly and in a short time.

Example of execution

A solution containing copper is heated in autoclaves, with a quantity of nickel alloy shavings, to a temperature of about 160°–180° C. the quantity of nickel in the nickel alloy shavings being so chosen that it corresponds to the quantity of copper in the solution. In a few hours, all the copper is precipitated from the solution and the solution is free from copper. Instead of the previous content in copper, it now contains a corresponding quantity of nickel.

The invention furthermore refers to the treatment of alloys containing copper and nickel or substances of like composition, in particular those having a nickel content which exceeds the copper content. These alloys are, according to the previous state of the art, not easily decomposable, for example by sulphuric acid, for treatment by wet process and for the production of nickel salts and copper salts, because at temperatures up to 100° C. they are scarcely soluble in sulphuric acid, and at temperatures up to 100° C. the precipitation of the copper by the nickel takes place too slowly, as is stated above.

It has now been found that the decomposition of such materials can be very considerably accelerated if the decomposition with acid takes place at temperatures of above 100° C. and under increased pressure.

It may with certain alloys and substances, be advisable to effect a preliminary oxidation of the material, by which they are oxidized on the surface, so that the dissolving reaction is more rapidly initiated.

The decomposition under the said conditions is completed in a shorter time and the copper is at the same time deposited by the nickel content, as cement copper, provided that it is a question of such alloys, the nickel content of which suffices to effect the complete separation of the copper.

In any case, a suitable classification of the materials to be treated can be effected, so that all the copper is deposited and, on the one hand, a nickel lye free from copper and, on the other hand, cement copper free from nickel, are obtained.

Example of execution

1000 g. of Monel metal scrap are heated for a short time to 700°–800° C. whereby they are thoroughly oxidized on the surface. The material thus preliminarily treated is heated in autoclaves with the suitable addition of sulphuric acid to about 160°–180° C. In a few hours, the decomposition of the material takes place and there is obtained a saturated crystallizable nickel-sulphate solution which must afterwards if necessary be separated from any existing impurities or from other metals, whilst the copper is deposited as copper powder or cement copper which can either be used as such, or can be converted in known manner to copper sulphate or other copper compounds.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Process for the precipitation of copper from solutions containing copper, by nickel, characterized by the precipitation taking place at temperatures above 100° C. and under increased pressure.

2. Process for the decomposition of alloys containing nickel and copper or other substances containing nickel and copper, the nickel content of which is greater than the copper content, or the nickel content of which is brought by the addition of nickel or material containing nickel, to a sufficient content in nickel, with the simultaneous separation of the copper from nickel by the process according to claim 1 characterized by the alloys and waste containing nickel and copper being decomposed by acid at temperatures of more than 100° C. with increased pressure, the copper entering into solution being precipitated by the nickel as concentrated or cement copper.

3. The process of precipitating metallic copper from solutions containing copper which consists in adding to the solution a quantity of nickel equivalent to the quantity of copper in the solution and subjecting the bath thus formed to a temperature between 160° and 180° centigrade and simultaneously therewith subjecting the bath to pressure.

4. The process of separating and recovering the copper from copper-nickel alloys which consists in subjecting scraps of the alloy to an oxydizing temperature until the surfaces of the scraps are oxydized, dissolving the oxydized material in a solution of sulphuric acid under pressure and at a temperature between 160° and 180° centigrade, and maintaining the heat and pressure until all the copper has been deposited.

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