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PROCESS FOR DESILVERIZING ALLOYS OF LEAD AND TIN

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4 Claims. (Cl. 75—79)

This invention relates to the refining of impure solder metals and provides an efficient process for desilverizing antimony-bearing alloys of lead and tin.

As a result of various metallurgical processes, there is produced a considerable tonnage of so-called "white metal" which in addition to lead and tin contains such elements as antimony, arsenic, copper, silver and gold.

It has previously been demonstrated that by treating such material with zinc, the arsenic, copper and gold contents may be substantially eliminated and the antimony and silver contents reduced to approximately one percent and six ounces per ton, respectively, and that further additions of zinc are of no avail in lowering the silver content.

It has now been found that the silver content of antimony-bearing solder can be readily reduced to a value far below that at which zinc alone is effective, by treating such solder with aluminum-zinc alloys of high aluminum content. The following specific example will serve to illustrate the process of the invention.

To 125.6 parts by weight of solder which had previously been subjected to a preliminary refining with zinc, there was added 5 parts by weight of aluminum-zinc alloy containing 10% aluminum. The alloy addition was made at a temperature of about 825° F.–850° F., incorporation of the alloy being facilitated by an ordinary mechanical mixer. The resulting dross was skimmed at approximately 800° F. and was amenable to pressing. The bath was cooled to freezing and reheated to about 600° F., all dross being removed. The analyses of the initial and final (92.3 parts by weight) metal were:

	Initial	Final
Lead	63.6%	61.67%
Tin	32.8%	33.0%
Antimony	1.0%	0.03%
Zinc	2.5%	5.2%
Silver	6 oz./T	1.6 oz./T

It will thus be seen that the invention provides a process by which the silver content of impure antimonial solders is readily eliminated to a decidedly lower value than is possible when using zinc alone as a reagent. In the above example, for instance, 81.5% of the silver, which it was impossible to remove by zinc alone, was separated from the solder.

The drosses containing the silver may, of course, be combined and treated in any of several known manners for the recovery of the values therein. The final metal of low silver content being saturated with zinc and aluminum is given a final treatment for the removal of these reagents as by stirring with lead chloride, or by introduction of gaseous chlorine, or by oxidation.

While the exact explanation of the results obtained by the invention are not clearly understood, it is believed that the relatively small amount of antimony, which is present and is not removed in the treatment of the alloy with pure zinc, exerts what may be termed a shielding action on the silver thereby preventing the zinc which is present and would normally combine with the silver from doing so. The explanation may then be that the introduction of the aluminum zinc alloy high in aluminum disturbs the equilibrium between the soluble zinc antimonide and the zinc-bearing solder rendering the former insoluble with the result that it drosses off and permits the zinc to attack the silver.

What is claimed is:

1. The process for desilverizing antimony-bearing alloys of lead and tin which comprises establishing a molten bath of such alloys, incorporating sufficient aluminum-zinc alloys therein to throw out of solution the bulk of the antimony thereby enabling the zinc to react upon the silver content of the bath, and separating the resulting drosses from the refined lead-tin alloy.

2. The process for desilverizing zinc-saturated solder metal containing relatively small amounts of antimony which comprises incorporating an aluminum-zinc alloy of high aluminum content in a molten bath of such metal and cooling same to approximately its freezing point thereby effecting a substantial desilverization of the metal.

3. The process for treating an alloy of lead and tin containing substantial amounts of antimony and silver which comprises initially refining a molten bath of such an alloy with zinc in quantities sufficient to partially desilverize the bath and render same substantially saturated with zinc, and thereafter finally refining the bath by incorporating therein an aluminum-zinc alloy in quantities sufficient to simultaneously effect practically complete removal of both antimony and silver from the zinc saturated bath.

4. The process for desilverizing alloys of tin and lead containing antimony which comprises saturating such an alloy with zinc and sufficiently saturating the zinc-saturated alloy with aluminum to permit the drossing of the silver by reaction with the zinc.

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