PRODUCT DATA SHEET

Indium Sulfamate Plating Bath

Introduction

Indium is a soft (modified Brinell .9 to 1) silvery-white metal with a brilliant metallic luster. It has a low melting point (156.7°C) and a relatively high boiling point (2080°C), therefore resulting in a low vapor pressure. It is ductile, malleable, crystalline, and diamagnetic. In the electromotive series, it lies between iron and tin.

Indium sulfamate is the preferred indium plating bath for the following reasons:

- The bath is a high-throwing power formulation. It is stable, easy to maintain and operate, and has a wide latitude of operational parameters, which allows for heavy industrial use.
- The bath uses soluble indium anodes, unlike other baths that require inert anodes that necessitate the use of expensive liquid concentrate for maintaining the indium concentration. This eliminates the need to "bail out" the excess plating bath from concentrate additions and the resultant waste disposal.
- No costly additives are required for operation. Grain refiners and leveling agents are present in sufficient quantities to last for the life of the bath.
- The solution begins to turn milky white when the pH rises above 3.5, indicating the need to add sulfamic acid—the only additive required in the operation of the bath.
- Recovery of the spent plating bath solution only requires raising the pH of the solution to precipitate the indium.
- With indium sulfamate, the high toxicity and resultant disposal costs of cyanide formulations are eliminated.

Uses

Indium-plated deposits have many industrial applications that take advantage of the unique physical and chemical properties of the metal indium including:

- Low melting point
- Low vapor pressure
- Inherent softness and malleablility
- Cold welding properties
- Anti-friction properties
- Alloy hardening properties

Such uses include:

- Surface protection
- Decorative finishing on metals and plastics
- Sealing applications
- Use in aircraft bearings
- Electrical interconnects in microelectronic devices

Operation

Indium sulfamate plating bath can use standard plastic or plastic-lined plating tanks with continuous filter pump agitation. The plating bath operates at room temperature, therefore no immersion heaters are necessary. Standard substrate pre-plating procedures (alkaline soak cleaning, rinse, acid activation, and rinse) should be followed. The current density range for plating with the sulfamate bath is 10 to 100 amps/ft^2, with 20 amps/ft^2 the preferred current density. The anode to cathode ratio should be 1:1 or higher. The anode efficiency is 100% and the cathode efficiency is 90% and remains relatively constant throughout the life of the bath. This means that over time, the concentration of indium in the plating bath will slowly rise. This rise in indium concentration causes no adverse changes in the operation of the plating bath. The plating deposition rate at 20 amps/ft^2 at 90% cathode efficiency is 0.001486"/hour. The pH of the bath tends to rise with use and should be maintained between 1 and 3.5 (1.5-2.0 preferred) by small additions of sulfamic acid dissolved in distilled or de-ionized water.

Sulfamate Plating Bath Kit

To facilitate the testing of indium sulfamate for plating, we offer a Sulfamate Plating Bath Kit. The kit contains a liter of ready-to-use indium sulfamate plating bath, 1.00" x .0625" x 12" anodes, and a plating guide book. The part number of the kit is 85502.

Safety Data Sheets

The SDS for this product can be found online at http://www.indium.com/sds

OVER→

Form No. 97686 (A4) R5

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Indium Sulfamate Plating Bath

Ready-To-Use Indium Sulfamate Plating Bath

Indium Metal	**30g per liter**
pH*	**1-3.5 (1.5-2 preferred)**
Temperature (static)	**Room temperature**
Cathode Efficiency	**90%**
Anode Efficiency	**Indium, 100%**
Throwing Power	**Excellent**
Quality of Plate	**Excellent**
Ease of Solution Analysis	**Easy**
Critical Working Temperature	**None, with or without agitation**
Color of Solution	**Clear when new; will darken after use due to organic material breakdown. This has shown no effect on deposit. Filtering of bath can be done through activated charcoal to maintain clarity of bath.**
Wettability	**Fairly easy**
Tendency to Pit	**None**
Control of Solution	**Metal and pH**
Current Density	**Optimum 10-20 amps per sq. foot If metal is increased, current density can be increased to 100 amps per square foot.**

* The pH of this bath is controlled by the addition of a 10% solution of sulfamic acid dissolved in distilled or deionized water.

All information is for reference only. Not to be used as incoming product specifications.

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