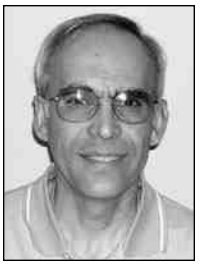

Stephen F. Rudy, CEF
Hubbard-Hall Inc.
563 South Leonard Street
Waterbury, CT 06708
E-mail: sfrudy@optonline.net

Trouble Shooting & Eliminating Problems In Plating Baths

All plating baths are similar in that a basis metal or previous deposition, are to be covered with a new layer of a specific metal. Every such bath is water based, operated within some specific temperature range, be it on a cold, warm or hot profile. Filtration is almost universally accepted as very important to maintenance and process operation. Anodes are mostly of the metal to be plated, with some applications for inert types. Agitation is normally required, be it mechanical or by air. When things go wrong, it has many times been something overlooked, or not properly set for the specific process. What to do? What resources are available to us? Where do we look or check? To get a handle on questions and add some other tips, let us consider items that can quickly focus on, resolve, and minimize re-occurrences of problems.

Suppliers

Suppliers and vendors provide technical expertise for their marketed plating processes. They can be a wealth of practical information and technical service. Technical bulletins provide operating parameters, procedures, maintenance, analysis, and many include basic trouble shooting guides. Many times basic analysis will confirm one or more bath concentrations to be off (deficient or in excess), operating parameters such as pH or temperature to be out of range. Appropriate corrections usually result in plating improvements. Breaking down what to check or look for in times of plating trouble, here is a good starting point as a responsible supplier would suggest:

- Basic wet analysis
- Hull cell evaluation (is the acknowledged problem reproduced)
- Operating parameters
- Current application and voltage
- Basis metal preparation and previous steps to the problem bath
- Rinsing

It is important to check any and as many of the processes associated with the specific plating problem. Frequently, the problem(s) with corrections can be readily identified early on. Be sure to evaluate as many of the contributing processes, since some problems are the result of more than just one or two other factors. As an example, plated parts have a haze and brittle deposit, instead of the expected bright and leveled appearance. The problems were found to be insufficient cleaning and excess of brightener in the plating bath. Simply put, poor cleaning not seen was supposedly compensated for by adding more brightener in the plating bath. This resulted in a brightener excess that caused deposit brittleness. The example problem just given also provides a very important fact that should be considered by every finisher and supplier:

The best definition of poison is too much

If an addition of a maintenance additive or corrector seems to help, do not overdose. Sometimes the proposed addition may only serve as a temporary masking effect, unfortunately exacerbating the original problem. This in turn can turn the first problem into a veritable monster. While we are considering basics, do not fall into the trap that many unfortunately do so:

You cannot violate Faraday's Law

Do not try to push or deposit more metal than the process is capable of doing so. One of the first lessons I learned in the industry is that it is OK to destroy a plating bath in the Hull cell by evaluating additions and treatments, if this is the best initial approach. Then, if proprietary product additions are required, consider first adding half of what is calculated as a requirement. It is immensely easier to add to the bath instead of removing an overdose. After completing the required purification treatment, corrective additions, plating usually resumes on trial basis while deposit characteristics and post analysis are verified.

Electrical and mechanical

Many times these supporting operating units can be overlooked or their importance not confirmed. Equipment is susceptible to malfunction and breakdown. Here are some useful tips and checks that can routinely keep the plating process optimized:

- Check rectifier for output and excess AC ripple.
- Make sure bus bar connections are sufficient and not corroded.
- Clean all electrical contacts
- In barrel lines, the insulated electrical lines should be warm not hot.
- Trace bus connections from rectifier, confirming correct to anode and cathode.
- In many return type or cycle master plating machines, the plating entry should be live. This is to prevent a bipolar effect.

Check operation and maintenance requirements for the plating bath filter. The manufacturer's recommendation for operation, packing of carbon and filter aid, and replacement, should be adhered to. The plating tank should be checked for dropped parts. Remove them as soon as it

is possible. Corroding parts contribute to metallic contamination of the plating bath and can also result in another source of the bipolar condition.

Anodes are another potential problem source. It is common for plating problems to be associated with anode baskets to be half full or less so. Acknowledging the higher prices for metal anodes is attentive to any seeming good price deals. A certificate of analysis should be provided with any quote or sale. Purity of anodes is very important. Recall the old ringing true saying: "Garbage in, garbage out".

Probably the best troubleshooting sequence is setting up and maintaining a good maintenance process. What to do is easy to identify and implement. Reviewing the tips in this article, taking supplier recommendations, and taking into account corrective actions to past problems, should provide good maintenance procedures and scheduling. Most important is minimizing plating problems. Rejects can be very expensive and significantly affect the desired production output. We are approaching the mid-year point where typical maintenance and purification procedures come into focus. Eliminating plating problems should be the driving force to maintain success. ***P&SF***

NASF Welcomes New Members*

We are pleased to announce that 7 new members have joined the NASF.* Please join us in welcoming them!

Individual Members

Matthew Holbrooks, Mauldin, SC

John Piel, St. Louis, MO

Sergiy Olifirenko, Toronto, Canada

Job Shop Members

Hartchrome, Inc., Watervliet, NY

Metal Finishing Company, Wichita, KS

Neo Industries, Inc., Portage, IN

Scovill Fasteners, Inc., Clarkesville, GA

All of our members are listed in our online directory found in the Members Only section of the site. To update your profile information, login here.

** As of May 11, 2010*

Test Your Plating I.Q. #461

By Dr. James H. Lindsay

Troubleshooting electroless nickel

1. Which are causes of skip plating?

   a. Substrate surface contamination
   b. High stabilizer content
   c. Too low temperature
   d. High agitation

2. Which are causes of pitting?

   a. High pH
   b. Organic contamination
   c. High agitation
   d. Low pH

3. Which are causes of poor adhesion?

   a. Poor rinsing
   b. Metallic contamination
   c. Organic contamination
   d. High agitation

4. Which are causes of low deposition rate?

   a. High temperature
   b. High pH
   c. High orthophosphite content
   d. Low hypophosphite content

5. Which are causes of no deposition whatsoever?

   a. High stabilizer
   b. Low temperature
   c. High pH
   d. Low agitation

Answers on page 67.