NIST Practice Guide Describes Engineering Standards

The National Institute of Standards and Technology (NIST), in cooperation with the ASM International Surface Engineering Committee, has issued a guide to published standards for the measurement and characterization of inorganic material surfaces.

"NIST Recommended Practice Guide: Surface Engineering Measurement Standards for Inorganic Materials" (NIST Special Publication 960-9) directs the user to appropriate standards based on material type, property of interest, and measurement or characterization method.

Each summary includes a general description of the standard, the intended application, specimen requirements, type of data produced and the limits of the method. The publication may be downloaded in Adobe Acrobat format at www.nist.gov. A print copy may be obtained by contacting Joyce Harris (301-975-6045; joyce.harris@nist.gov).

FSCT Approves New Bylaws; Restructures Governing Bodies

At its November 6 meeting in Las Vegas, NV, the board of directors of the Federation of Societies for Coatings Technology (FSCT) approved sweeping changes to the organization's bylaws that significantly revised the structure of the FSCT's governing board and eliminated the executive committee.

Effective February 2006, the restructure will replace the current 36-member board of directors with a new nine-member board that will be selected directly by the membership in an election scheduled to take place in January.

The board also elected for two-year terms Dr. Rose Ann Ryntz of Visteon, as president, and Dr. Yasmin Sayed-Sweet, or Alberdingk Boley, Inc., as vice president. Joseph Pontoski, FSCT staff controller, was elected to a one-year term as secretary-treasurer.

Dr. Ryntz is senior manager for advanced material and fastener engineering, and staff technical fellow, for Visteon Corporation, Dearborn, MI. She has served on the FSCT executive committee and the board of directors, and chaired the professional development and annual meeting program committees.

Dr. Sayed-Sweet is strategic business director with Alberdingk Boley, Inc., Greensboro, NC. She was previously employed with Cook Composites and Polymers, Kansas City, MO.

Dr. Sayed-Sweet was elected FSCT secretary-treasurer in 2004-05, and has served on the FSCT board, both as an officer and a director, since 2000.

Pontoski is the controller and director of administration for the FSCT. He has held that position for almost 10 years. He is a certified public account and recently earned a MBA from St. Joseph's University, Philadelphia, PA.

Test Your Plating I.Q. #413

By Dr. James H. Lindsay, AESF Fellow

Which of the following do not belong in the group?

1. Phosphate, sulfate, nitrate, titrate, carbonate
2. Saturated calomel, hydrogen, dropping mercury, ferrous/ferric, silver/silver chloride
3. Tensile strength, electrical resistance, ductility, modulus of elasticity, internal stress
4. Cyanide, sulfamate, fluoborate, chloride-sulfate, chloride-acetate
5. Zinc, aluminum, gold, copper, chromium

Answers on page 25

Company News

❑ Best Metal Finishing, Osgood, IN, has received certification for ISO 9001:2000, the most recent upgrade for the management system that places more emphasis on continual improvement and customer satisfaction.

Steve Schneidau, operations manager, said: "The ISO recognition will allow Best Metal Finishing to better serve its Tier II and Tier III automotive supply customers as well as out other industrial customers. Best Metal Finishing is a niche plating operation, specializing in delicate barrel zinc, rank zinc and zinc phosphate plating. The company is also well versed n trivalent chromates.

❑ The Kushner Electroplating School, Sunnyvale, CA, has announced the schedule for its 2006 two-day training program. "Electroplating Know How Basics" will be offered at: Greenville, SC, April 3–4; Cincinnati, OH, April 6–7; Providence, RI, April 10–11; and Seattle, WA, April 17–18.

The two-day program covers mathematics of electroplating; chemistry and electrochemistry of electroplating; environmental issues; safety issues; plating cycles; cleaning and rinsing techniques; and testing procedures.

For information, contact Bobby Kushner at info@platingschool.com.

In Memoriam: Roger Winterman

Roger Winterman, a long-time honorary member of the Cincinnati Branch and first emeritus member of the Cincinnati/Dayton Branch, passed away on October 23. He was the Cincinnati Branch treasurer for many years, and served as treasurer for the Tri-State Regional meetings that were hosted by the Cincinnati Branch. During his career, he was associated with Chemicals, Inc., and The Globe Chemical Company.

all brightness and leveling of the nickel deposit. These addition agents are usually consumed the quickest, due to their overall co-deposition. Class II brighteners are the main components in finished products that also contain some of each of the previously described Class I brightener agents. These products are usually consumed at the rate of one gallon per 8,000–12,000 ampere hours. To maintain the desired overall characteristics of the nickel deposit, frequent additions may be required during the production schedule. This is readily facilitated by automatically dosing the brightener product. This is accomplished by interfacing an addition pump with an amp hour meter, that has been programmed to activate the pump. Care must be taken to maintain the desired addition rate of product. Too little will result in dull, poorly leveled deposits. An excess will lead to deposit brittleness and poor low current density deposit (dark, lack of coverage). Excesses can be corrected by dummy electrolyzing, carbon filtration, and addition of Hydrogen Peroxide.

Another type of the "hotter" brighteners are the organic pyridine containing compounds. These additives provide a quick fix, in that relatively thin deposits can be obtained with exceptional brightness and leveling. These Class II brightener agents also contain some of the Class I materials in the finished product. Their use or application are similar to the previously described agents, only the activity is much more pronounced. The pyridine containing brighteners enable, where possible, for a thinner nickel deposit to meet aesthetic specifications. This, in turn, can be a huge savings when factoring in the current market pricing for nickel anodes and salts. Excesses of pyridine containing brightener products expose a unique problem. Dull mid to low current density deposits will not readily respond to dummying, carbon filtration, or the addition of strong oxidizers (hydrogen peroxide or potassium permanganate). Purifiers in the form of specific reducing agents must be added to clear up the deposit. Sometimes these additives are referred to as "brightener reducers."

There is another Class II brightener that contains substituted alcohols. These additives also promote rapid brightness and leveling. However, due to their volatility, booster adds to the nickel bath are necessary. This includes periods of bath inactivity.

Anti Pit Wetting Agents

Additives to prevent gas pitting

These are specific surfactant blends, that reduce the surface tension of the Watts nickel solution, thereby eliminating pitting due to the formation of hydrogen gas bubbles. It has been determined that maintaining the surface tension of the nickel solution from 35–40 dyne/cm^2 will prevent hydrogen gas pitting. Rack air agitated plating baths require low foaming anti pit agents. Barrel and rod agitated rack or still baths require surfactants that happen to be higher foaming. The higher foaming anti pit is also a good emulsifier for oils and grease that may have contaminated the nickel bath. In either case the anti pit product concentration may range from 0.25–1.2% by volume. These additives do not plate out, but are consumed through solution drag out loss and by carbon filtration.

Additives to prevent pitting due to fine particulates

One type of additive is a mixture of organic agents that disperse fine particulates, thus preventing their adhesion to parts during plating. It will facilitate the action of filtration, to help clear up the solution. These addition agents are consumed by drag out and are carbon sensitive.

Additives to prevent pitting due to iron contamination

Reducing agents and complexors react chemically with ferric iron (Fe3+), that is precipitated in the bath as fine particles. The additive concentrate will reduce the iron to the ferrous state (Fe2+) and complex it, to prevent it from plating out in the deposit. Sometimes these are referred to as iron control agents. Product additions of 0.5–1 oz/gal for maintenance purposes may be sufficient. It is usually applied where there is a heavy emphasis on the plating of tubular steel, connectors, and fasteners.

Purifiers

Metallic contaminants and brightener excesses may wreck havoc with production plating schedules. If not, the quality of nickel plated work will probably be compromised.

Metallic impurities, zinc and copper, can be rapidly and effectively addressed to maintain uninterrupted nickel plating. The important consideration is that contamination is not excessive, to render the additives relatively useless. In this regard, 10-100 ppm can be handled. The purifiers depolarize the cathode film on the plated surface, allowing the contaminant to plate out over a wide current density range. It results in a preferable "white" nickel deposit, especially in the effected low current density areas. The product concentrate contains the purifier agent along with a small amount of brightener, leveling agent. 0.1–0.5% by volume addition ranges may be required for effective corrective action. Purifiers are not meant to be regular plating additives. Rather, these are considered to be service products. If frequently used, the product is being miss-used or the source of contamination is not being properly addressed.

Iron control agents have been described in the previous section. Brightener reducing agents have also been previously described. *P&SF*

Answers to I.Q. Quiz #413

1. Titrate (The others are chemical names.)
2. Ferrous/ferric (The others are electrodes.)
3. Electrical resistance (The others are mechanical properties.)
4. Cyanide (The others are nickel plating chemistries.)
5. Aluminum (The others are plated from aqueous solution.)