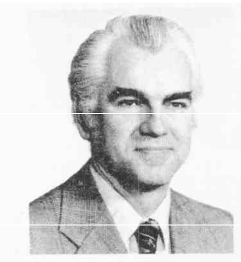
WHAT'S NEW IN SURFACE FINISHING?

Patents and Select Literature Citations

By Dr. George Karustis



As a service to our readers, this column provides notification of recent highlights in surface finishing technology, such as new developments, important literary contributions, and patent information.

Precious Metal Plating

Characterization of Gold Layers Selectively Plated by a Pulsed Current, G. Franz, *Thin Solid* Films, 1989, 169(1), 105-15 (Eng.). Seven µm of relatively stress-free fine-grain gold was produced by pulsed deposition. Densities of about 19.1 and a Vickers hardness of 70 to 110 were achieved. Carbon content was low and conductivity was 2.8 microhm-cm.

A New Pure Palladium Electrodeposit for Electronic Applications, A. Blair, G. Karustis and J. Wilcox, *Trans. Inst. Met. Finish.,* 1989, 67(1), 10-12 (Eng.). A new palladium deposit and its method of preparation are described.

Nonprecious Metal Plating

Electrodeposition of a Chromium-Iron Alloy from a Sulfuric Acid Electrolyte, F.I. Danilov, et al., *Elektrokhimiya, 1989, 25(3), 409-12* (Russ.). Bright chromium-iron deposits were produced from electrolytes containing potassium chromium sulfate, ammonium sulfate, boric acid, and ferrous sulfate; formic or tartaric acid could be used as completing agents. Pores and cracking were observed in deposits having thicknesses greater than 3 µm; the deposit, in the presence of iron, was bright up to 10 µm.

Study of Single-Step Process for Electroplating Copper on Aluminum Alloys, Z. Guo, et al., *Diandu Yu Huanbao, 8(6),7-10* (Ch.). Copper was plated directly on aluminum alloys by first forming an aluminum oxide layer on the aluminum via anodization, then reversing the current to deposit copper. (An acidic copper sulfate electrolyte was employed.)

Wear Resistance of Nickel and Nickel-Phosphorus Alloy Electrodeposita, C. Holden, et al., IEEE *Trans. Compon. Hybrids Manuf. Technol., 1989, 12(1),* 64-70 (Eng.). Nickel-phosphorus alloy deposits produced from nearly neutral solutions have lower contact resistance and better wear properties than nickel deposits produced from Watts or sulfamate solutions. Some specimens also had a thin layer of cobalt-hardened gold over the nickel phosphorus deposit. Unfortunately, wear and contact resistance after aging tests have not been described.

Electroless Deposition

The Effect of Grain Size on Ductility and Impurity Content of Electroless Copper, S. Nakahara, et al., J. Electrochem. Sot., 1989, 136(4), 1120-3 (Eng.). Ductility of electroless copper deposits increased as grain size increased. Deposits having grain sizes of 0.2 to 2 µm and 10 to 40 µm had ductilities of 0.8 to 6 percent and 2 to 12 percent, respectively. Ductility was also affected by diffusible hydrogen and void content of the electroless copper deposit.

Decomposition of Citrate in Electroless Cobalt-Phosphorus Plating Baths, J. Horkens, et al., J. *Appl. Electrothem., 1989, 19(2), 152-6* (Eng.). It was shown that citrate gradually decreases in electroless cobalt solutions. The loss is caused by a thermal decarboxylation catalyzed by cobalt ion. The reaction occurs only in oxygen-containing solutions and its rate is limited by the rate of oxygen diffusion.

Electric Conductivity of Electroless-Deposited Copper Coatings, M. Enchave, et al., *Metalloberflaeche, 1989, 43(1), 21-3* (Ger.). The specific electrical conductivity of electroless copper was dependent on the completing agent in the formulation. Increased thicknesses of metal did not necessarily lead to increased conductivity because of plating defects, inclusions, residual stresses, etc. ❑

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