

Non-Cyanide Electrolytes for Gold Plating – A Review

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Nowadays, the cyanide and ferrous cyanide solutions are used in practice for gold plating. The traditional baths employed for soft gold as well as hard gold plating contain the cyanide complex, $[\text{Au}(\text{CN})_2]^-$, as the source of gold, which release free cyanide ions during the plating. Those compounds are very toxic, and formation and maintenance of cyanide baths is expensive and risky for technical personnel; also, they attack photoresists used to delineate circuit patterns and bonding pads. Due to this reason, and especially in modern time, there is a trend of using the electrolytes without content of cyanides. These electrolytes are mainly based on some organic compounds. This article is an overview of the non-cyanide electrolytes for gold plating introduced into practice or only tested in the laboratory. The large number of investigated complexes fulfils the coating quality requests, but there are problems related to their stability. Decorative gold plating obtained from classic cyanide electrolyte and an electrolyte based on mercaptotriazole have shown similar characteristics such as microhardness, surface roughness, visual appearance and adhesion. At the same time, this bath remained stable in a period of at least nine months.

Keywords: Electroplating, Gold baths, Stability constants, Complexing ligands, Photoresists, Soft gold

1. INTRODUCTION

The history of gold deposition began in the early nineteenth century when many art objects were electroplated with gold. It has been traced to the early work of Brugnatelli in 1805 [1]. Gold electroplating formulations based on the double salt gold potassium cyanide was patented in 1840. Since then, many types of gold formulations have been produced to meet the market requirements. Due to the changing trends in fashion, the application of certain colours or shades of the electroplated gold can only last for about forty years [2, 3]. The electronics industry began its development in the 1940's and 1950's; during this period, platters faced new demands for deposits with different properties,

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A red circular graphic with a gradient, appearing as a semi-circle or a partial circle, located to the right of the SCS Engineers text.

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Modern Technology of Acid Slurry, Surfactants, Soap and Detergents with Formulae , Chemical Resistance of Thermosets Erwin Baur,Katja Ruhrberg,William Woishnis,2018-04-27 Chemical Resistance of Commodity Thermoplastics provides a comprehensive cross referenced compilation of chemical resistance data that explains the effect of thousands of reagents the environment and other exposure media on the properties and characteristics of thermosets plastics which are used in a range of applications Specifically the resistance data in this book covers the following materials allyl epoxy unsaturated polyester resin unsaturated polyurethane resin vinyl ester resin furan resin polyaminobismaleimide acrylics polycyanurates and filled reinforced thermosets A huge range of exposure media are included from aircraft fuel to alcohol corn syrup hydrochloric acid and salt to silver acetate This book is a must have reference for engineers and scientists designing and working with thermosets in environments where they come into contact with corrosive or reactive substances from automotive and aerospace to coatings adhesives electrical insulation fittings and other applications Presents comprehensive comparable and trustworthy chemical resistance data for thousands of exposure media on the properties of thermosets Includes coverage of ionomers polyethylene polypropylene polystyrene PVC and other polyolefins and polyesters Provides a must have reference for engineers selecting materials for a range of application areas using thermosets including aerospace automotive chemical process industries coatings and adhesives

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,1998 **Waste Audit Study of Gold, Silver, Platinum, and Other Precious Metals Products and Reclamation** SCS Engineers,1990 **The International Journal of Microcircuits and Electronic Packaging** ,1998 Industrial Waste Treatment Kenneth D. Kerri,1996 This manual is designed to train operators in the safe and effective operation of industrial waste treatment plants It covers the importance and responsibilities of an industrial wastewater treatment plant operator Information is provided on the importance of being an operator safety waste minimization physical chemical treatment process treatment of metal wastestreams and instrumentation *Electroplating & Metal Finishing* ,1972 Issues for Jan 1954 Aug 1955 include a section Metal finishing abstracts later issued separately *Proceedings* ,1998 *Plating of Plastics with Metals* Maurice William Ranney,1974 **Gold Bulletin** ,2004 Finishing Industries ,1978 Pollution Prevention Technology Handbook Robert Noyes,1993 Technical information relating to current and potential pollution prevention and waste minimization techniques in 36 industries with many opportunities for cross utilization When wastes are reduced or eliminated substantial economies can be realized by reduced expenditures for pollution control equipment and lower treatment and disposal costs Other considerations include lessened liability problems and improved public image The thousands of items of technological advice in the book make it a valuable reference source Energy Research Abstracts ,1980 **Pretreatment Facility Inspection** Kenneth D. Kerri,1996-07 This manual designed to train inspectors to use safe and efficient procedures for inspecting industrial pretreatment facilities stresses the duties and responsibilities of a pretreatment inspector It contains information on recommendations from the DSS Domestic Sewage Study and PIRT Pretreatment Implementation Review Team and information on how inspectors can assist and encourage industry with waste minimization programs

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