
Electroplating Engineers of Japan Commences Provision of Electroless Immersion Gold Plating Solution Enabling Plating on Semiconductor Package Substrates without Using Highly Toxic Cyanide Compounds

Thick layer required for package substrates made possible by a deposition rate of more than double the conventional non-cyanide gold plating solutions

Realizing the same stability and productivity as cyanide gold plating solutions

Tanaka Holdings Co., Ltd. (a company of Tanaka Precious Metals, Head office: Chiyoda-ku, Tokyo; President & CEO: Akira Tanae) today announced that Electroplating Engineers of Japan Ltd. (Plant and Office: Hiratsuka-shi, Kanagawa; President & CEO: Koichiro Tanaka; EEJA) will begin providing the IGS2020 (LECTROLESS IGS2020) electroless immersion gold plating solution without cyanide compounds. EEJA will have an exhibit at JPCA Show 2014 on electrical circuits and printed electronics held at Tokyo Big Sight (Koto-ku, Tokyo) over a course of three days from June 4 (Wed) until June 6 (Fri), where the characteristics of LECTROLESS IGS2020 will be explained in an NPI Presentation.

■ A non-cyanide gold plating solution realizing the same performance as cyanide gold plating solutions

LECTROLESS IGS2020 is a completely cyanide free electroless immersion gold plating solution used in the plating of gold on nickel and palladium. By revising the composition of the plating solution, EEJA has succeeded in developing a gold plating solution with the equivalent characteristics as cyanide immersion gold plating solutions using potassium gold cyanide (PGC) such as being able to reduce the deposition (film formation) time from 10-30 minutes to 5-10 minutes, and suppressing variation in deposition. The thickness of the film of gold plating also enables deposition of 0.03-0.1 micrometers (micrometer is a millionth of 1 meter), which is faster than when using the conventional non-cyanide immersion gold plating solutions, providing productivity enabling support for products such as semiconductor package substrates. It is possible for customers to use existing processes without the need for new capital investment.

Characteristics of LECTROLESS IGS2020

- Completely cyanide-free
- Same or faster deposition and low film thickness variation compared to conventional cyanide immersion gold plating solutions (CV<10%)
 - Deposition speed: 0.05 micrometers/ 5 minutes on nickel
 - 0.05 micrometers/ 8 minutes on palladium
- More than double the deposition speed of conventional non-cyanide plating at the same operating temperature (50-60°C)
- Restrains excessive corrosion of nickel
- No need for new capital investment
- Able to support applications such as semiconductor package substrates

■ Issues in eliminating cyanides from cyanide gold plating solution

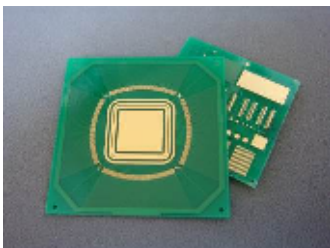
At present, most plating solutions in processes for plating nickel and palladium for semiconductor components, etc. utilize PGC. However, cyanide compounds such as PGC are highly toxic, and not only require safety equipment in the working environment, but also create concerns about adverse effects on the natural environment due to poor treatment of wastewater containing plating solution, and this has led to increased moves for regulation worldwide, including China. Because of this, the precious metals industry was faced with the issue of developing cyanide free electroless immersion gold plating solution.

Technology using gold sulfite salt instead of cyanide compounds had already been established as a means of eliminating cyanides from gold plating solutions, but manufacturing applications are limited to electrolytic plating of wafers, etc., and it was necessary to develop an electroless plating method that could be used for substrate applications such as packages.

■ Electroless immersion gold plating process

The most common processing technique used in the manufacture of semiconductor components, etc. is wet plating in which the item to be plated is immersed in a metal solution. Wet plating can be categorized into electrolytic plating and electroless plating, and electroless plating can be further categorized into immersion type and autocatalytic type (reduction type) plating.

A typical electroless immersion gold plating method involves a process of forming (depositing) a film of gold in which a nickel-coated object is immersed in a plating solution containing gold ions, and when the nickel dissolves, the gold ions move to the electrons remaining on the surface of the object being plated, forming metal when bonded with the electrons (the electrons in the nickel "displace" the gold in the plating solution). LECTROLESS IGS2020 , provided by EEJA, provides the solution stability that restrains excessive corrosion (oxidation) of nickel covering the object being plated. The excellent deposition characteristics ensure highly reliable contacts in soldering.



LECTROLESS IGS2020 can be used on semiconductor package substrates, etc.

■**Tanaka Holdings Co., Ltd. (Holding company of Tanaka Precious Metals)**

Headquarters: 22F, Tokyo Building, 2-7-3 Marunouchi, Chiyoda-ku, Tokyo

Representative: Akira Tanae, President & CEO

Founded: 1885

Incorporated: 1918

Capital: 500 million yen

Employees in consolidated group: 3,895 (FY2012)

Net sales of consolidated group: 839.2 billion yen (FY2012)

Main businesses of the group:

Manufacture, sales, import and export of precious metals (platinum, gold, silver, and others) and various types of industrial precious metals products. Recycling and refining of precious metals.

Website: <http://www.tanaka.co.jp/english> (Tanaka Precious Metals),

<http://pro.tanaka.co.jp/en> (Industrial products)

■**Electroplating Engineers of Japan Ltd. (EEJA)**

Head office: 5-50 Shinmachi, Hiratsuka-shi, Kanagawa

Representative: Koichiro Tanaka, President & CEO

Established: 1965

Capital: 100 million yen

Employees: 90 (FY2012)

Sales: 24,330 million yen (FY2012)

Areas of Business:

1. Development, production, sales and export of Sel-Rex precious metal and base metal plating solutions, additives, and surface processing-related chemicals through a technical partnership with the Enthone Group
2. Development, production, sales, and export of plating equipment
3. Import and sales of plating-related products

Website: <http://www.eeja.com/>

<About the Tanaka Precious Metals>

Established in 1885, the Tanaka Precious Metals has built a diversified range of business activities focused on the use of precious metals. On April 1, 2010, the group was reorganized with Tanaka Holdings Co., Ltd. as the holding company (parent company) of the Tanaka Precious Metals. In addition to strengthening corporate governance, the company aims to improve overall service to customers by ensuring efficient management and dynamic execution of operations. Tanaka Precious Metals is committed, as a specialist corporate entity, to providing a diverse range of products through cooperation among group companies.

Tanaka Precious Metals is in the top class in Japan in terms of the volume of precious metal handled, and for many years the group has developed and stably supplied industrial precious metals, in addition to providing accessories and savings commodities utilizing precious metals. As precious metal professionals, the Group will continue to contribute to enriching people's lives in the future.

The eight core companies in the Tanaka Precious Metals are as follows.

- Tanaka Holdings Co., Ltd. (pure holding company)
- Tanaka Kikinzoku Hanbai K.K.
- Tanaka Denshi Kogyo K.K.
- Tanaka Kikinzoku Jewelry K.K.
- Tanaka Kikinzoku Kogyo K.K.
- Tanaka Kikinzoku International K.K.
- Electroplating Engineers of Japan, Limited
- Tanaka Kikinzoku Business Service K.K.