

Tanaka Solidifies Lead in Precious Metals Industrial Products

The Tanaka Kikinzoku Group, which boasts the largest precious metals business in Japan, has carried out a wide range of activities in various business areas focusing on the precious metals business, and the Group's sales have been expanding since founded in 1885. In the 2009 fiscal year, the Group's consolidated sales were US\$8.4 billion (converted by ¥85/US\$1).

In April 2010, the Group was reorganized to Tanaka Holdings Co., Ltd. as the Group's pure holding company. Since then, the Group continues to provide a variety of products and services in its capacity as a team of experts specializing in precious metals.

Tanaka Claims Global Attention

The core company of the Group is Tanaka Kikinzoku Kogyo K.K. Since founded in 1885, this company has been engaging in the refining and analysis of precious metals, such as platinum and gold, as well as the development, production, and sale of various industrial products made of precious metals for 126 years.

In 1889, the company was the first in Japan to successfully manufacture platinum filaments for use in light bulbs. Thereafter, the company commenced production of contacts for communication equipment, crossbar-type contacts for telephone exchanges and so forth, which were primarily made from precious metals. In recent years, the company has maintained its dominant share globally in extra-fine gold bonding wires, which are indispensable in the production of industrial products such as semiconductors.

Currently, the company is working to develop and commercialize reinforced precious metals for use in automotive sensors, exhaust gas purifying catalysts, fuel cell catalysts, and glass melting equipment.

The Base of Group's Activities

The Tanaka Kikinzoku Group bases its activities on eight precious metals, namely: platinum (Pt), gold (Au), silver (Ag), pal-

ladium (Pd), rhodium (Rh), iridium (Ir), ruthenium (Ru), and osmium (Os). In particular, manufacture and sale of the industrial commodity using these precious metals occupies 70 percent of the whole group, and high value precious metals asset products and precious-metals jewelry occupy 15 percent each.

As a specialist in precious metals, the Group carries out activities under the slogan "Making an Exhaustive Study of Precious Metals" with a three-pillar approach.

Additionally, the Group is also actively involved in responding to environmental issues, including pollution and energy issues through R&D, which focuses on precious metals and business activities, aiming to ensure a stable supply of such materials.

Electroplating Engineers of Japan

With Tanaka Holdings Co., Ltd. as the lead, the Group has a total of 22 subsidiaries - 10 domestic companies and 12 overseas companies. As a global company, from early

time, the Group has established production and sales bases one after another in Europe and the United States as well as Asia, including China, and the expansion of such bases still continues today.

Further, in 1965, the Group established the Electroplating Engineers of Japan (EEJA) jointly with the Enthone Group, the world's largest manufacturer of surface treatment chemicals headquartered in Connecticut, United States, and has since been engaged in the development, sales, and exports of SEL-REX precious/base metal plating solutions, additives, surface treatment-related chemicals, and wafer plating equipments.

With headquarters and a plant in Hiratsuka, Kanagawa Prefecture, in Japan, EEJA has laboratories conducting advanced research in the United States, Taiwan, and Korea.

Product, Technology Showcases

The company is planning to take part in various exhibitions, including the Korea Printed Circuit Association (KPCA) show 2011, this April, as well as the Photonics Festival in Taiwan, Semicon Taiwan 2011, and Taiwan Printed Circuit Association (TPCA) show 2011 to appeal the value of its products and technologies. □



Wide range of applications of Tanaka's technologies

Custom Boards with Value-Added Functions to Suit Each Application

Electronic devices continue to gain in performance, speed, and density. Our integrated production system handles everything from pattern design to manufacturing, allowing us to offer custom boards with special functions added to suit individual applications.

■ Solutions to increase speed/frequency

- For users who wish to control characteristic impedance (Z_0) with constraints in the number of layers and specifications:

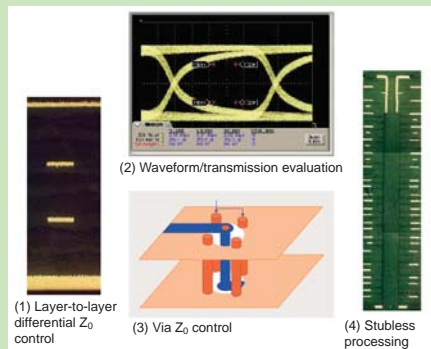
→ We propose layer-to-layer differential Z_0 control as well as other types of control in various configurations. (1)

- For users who wish to evaluate waveform quality and transmission characteristics:

→ We conduct evaluations using a complete set of evaluation equipment. (2)

- For circuit designers who wish to improve the quality of via waveforms:

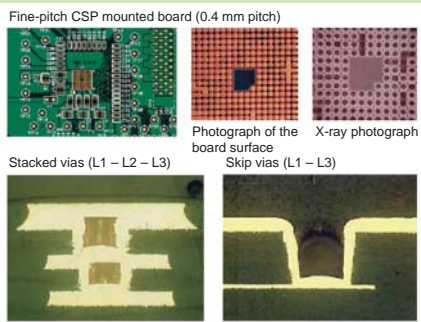
→ We propose improving signal reflection through via Z_0 control and the elimination of unwanted substances. (3), (4)



■ Solutions for high density

- For users who wish to implement high-density, high-functional components or to reduce component size:

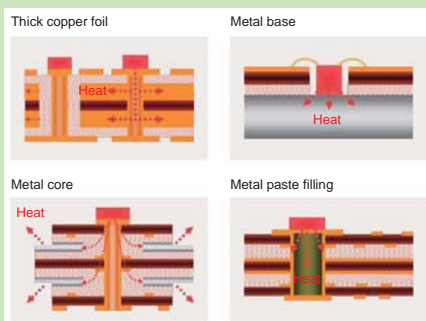
→ We provide high-density, fine-pitch wiring boards, which use a build-up structure or fine hole drilling technology.



■ Solutions for large currents and heat radiation

- For users who wish to mount components supporting large currents and high heat generating components, such as wiring boards for electric vehicles:

→ We propose various types of heat radiation structures, which support large currents and are suitable for individualized applications.

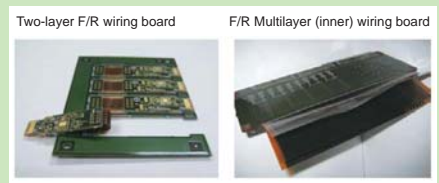


■ Flex-rigid (F/R) solutions

- For users who wish to eliminate the connector joints problems between wiring boards:

→ We have developed two to eight flexible layers (supporting Z_0 control).

These layers eliminate connection failures, connector contact resistance, spatial implementation restrictions, the need to secure connector space, and problems with the number of man-hours required for mounting connectors.



■ Others

- Wiring boards, which support high frequencies that correspond to various low dielectric materials

- High-thickness, high-multilayer wiring boards for semiconductor testers

- Fine-pitch, large-sized evaluation boards for burn-in tests

- Composite structures, which combine general-purpose FR-4 and low dielectric material

- Countersink boards, which allow for size reduction and improvements in heat radiation

- Wiring boards which support halogen-free/lead-free implementations

- Quality control systems that enabled our plants to be certified by the Ministry of Defense and JAXA



The Future is Precious.

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EEJA's Proposal for a Cost Down Processing by the Expertise in Precious Metal Plating Technologies

Electrolytic Ni/Pd/Au process for PWB surface treatment application

The electrolytic Ni/Pd/Au process is a new processing technology proposed by EEJA that supersedes existing electrolytic Ni/soft Au and Ni/hard Au processes for printed wiring board (PWB) surface treatment. The greatest benefit of the new processing technology is the cost effectiveness.

As is well known, we are currently experiencing an unprecedented increase in the price of gold. This has placed a considerable strain on manufacturing costs in the PWB surface treatment industry. Our electrolytic Ni/Pd/Au process not only provides the same plating characteristics as the conventional electrolytic Ni/soft Au and Ni/hard Au processes, but also possibly offers a 40 to 60 percent reduction in the materials costs of Au plating process.

This cost reduction has been made possible by a reduction in the amount of gold in plating, by forming a thin plated layer. The placement of a Pd plated layer, which has excellent barrier properties, between Ni and Au layers has enabled the thickness of an Au plated layer reducing to one-third or less of conventional thickness.

The electrolytic Ni/Pd/Au processing tech-

nology has been used in the PPF process for lead frames and similar applications for some time. However, it has been impossible to apply conventional Pd plating solutions to PWBs, which have a photoresist layer on their surfaces, since the strong acidity or alkalinity of such solutions causes damage to PWBs. EEJA has succeeded in applying Pd plating on PWBs that could not be achieved using conventional processing technologies by neutralizing the Pd plating solutions (pH: 7.0).

In addition, EEJA's Pd plating process technology uses a special additive that improves the coating density. This prevents the diffusion of under layer, thereby improving heat resistance and corrosion resistance, as well as enabling thinner plated layers than conventional processes.

We recommend users of our electrolytic Ni/Pd/Au process to use a solution with lower precious metal concentration for Pd (PALLADEX ADG or ADP) and Au (TEMPEREX MLA) processes in electrolytic Ni/Pd/Au process. Such a solution reduces initial costs as well as running costs.

No major changes to existing equipment are required for the introduction of the electrolytic Ni/Pd/Au process. To apply this processing technology to existing plating process, all they have to do is make slight alterations to existing baths or add a Pd bath.

As explained above, EEJA's elec-

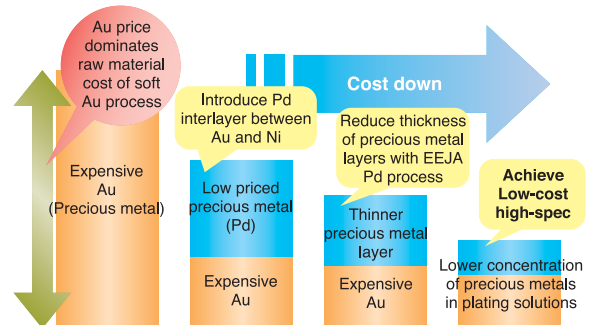


Fig. 1: Cost down concept

	Sulfamex 100	Palladex ADG-800	Temperex MLA200
Metal content (g/L)	Ni 75	Pd 3	Au 3.5
Purity (%)	—	99.9	99.9
Deposition rate (min)	—	5.4 (0.75A/dm ²)	4 (0.4A/dm ²)
pH	3.0	7.0 Neutral pH	4.7
Temperature (°C)	50~60	45~55	50~70

Fig. 3: EEJA electrolytic Ni/Pd/Au process

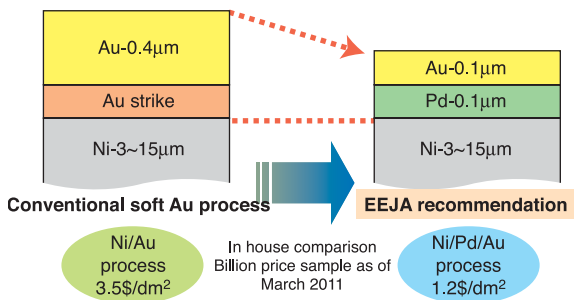


Fig. 2: Thickness specification and comparison of precious metal cost

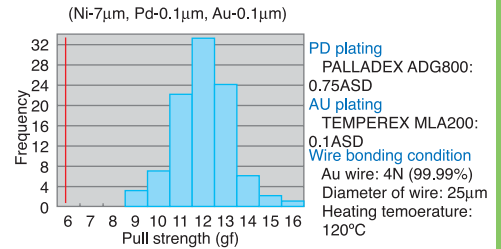


Fig. 4: Histogram of pull test result

trolytic Ni/Pd/Au process offers lower costs and higher performance than conventional processes. As such, we recommend you to consider replacing conventional processes with this new process. Neutral Pd processes are not only applicable to the plating of PWBs, but also to various types of applications.



As a joint company between Tanaka Kikinokogyo K.K. and Enthone Inc., EEJA was established in 1965. Through the unified strength of the group and its expertise in precious metal surface treatment, EEJA has been offering high quality plating technologies mainly in semiconductors and electronics industries.

With its technologies and know-how, EEJA offers the next-generation plating processes that allow lower-cost and higher-spec simultaneously to meet the latest needs of our customers.



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