

January 17, 2012

Tanaka Precious Metals  
Tanaka Holdings Co., Ltd.

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## **Tanaka Precious Metals Begins Providing World's First Silver Ink Able to Form Electronic Circuits with UV Light**

**Enabling wiring through room-temperature hardening without heating,  
optimal for all base materials such as PET film**

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Tanaka Holdings Co., Ltd (a company of Tanaka Precious Metals, Head office: Chiyoda-ku, Tokyo; President & CEO: Hideya Okamoto) today announced that Tanaka Kikinzoku Kogyo K.K. (Head office: Chiyoda-ku, Tokyo; President & CEO: Hideya Okamoto), which operates the Tanaka Precious Metals' manufacturing business, had commercialized the world's first conductive silver ink capable of forming electronic circuits using only hardening by ultraviolet (UV) light without the need for hardening by heating, and will begin selling the product on January 18.

After printing a circuit on base material using this ink and exposing it to UV light for approximately 0.3 seconds, the user can instantly harden the printed film even at room temperature to form a circuit that carries current. At a film thickness of five micrometers or more (one micrometer is one millionth of a meter), it is possible to form wiring on the same level as the conductive material generally used at present, with electrical resistivity of  $10^{-3}\Omega\text{cm}$  ( $10^{-3}\Omega$  per 1 centimeter).



An electronic circuit created through flexographic printing using the silver ink that is to be released

By using this ink, it is possible to perform wiring not only on glass base material and substrates, but also flexible base material such as polyvinyl chloride film (PVC film) and polyester film (PET film) on which it was previously difficult to form electronic circuits due to their susceptibility to heat. In particular, because it is possible to form wiring on all types of film base material by attaching this silver ink using flexographic printing that transfers ink by making it adhere to protrusions on a rubber plate, this ink is very effective wiring material for printed electronics which produces electronic components by printing. It is expected to be applied to electronic circuits in a wide range of products including solar cells (silicon, dye sensitized, etc.) and organic EL (electroluminescence) lighting, in addition to touch panel displays, electronic books, RFID (radio-frequency identification) tags and electronic packaging for use in drug therapy monitoring.

### ■ Challenge in Thermal Hardening

A variety of technologies are currently being developed to enable popularization of printed electronics on a practical level as a next generation technology able to produce electronic equipment that is thin, lightweight and difficult to break at a low cost. Wiring materials such as materials enabling current to be carried in a circuit by heating printed metal nanoparticles are being developed, but it is necessary to form circuits without heating in order to form circuits on all types of base material such as PET film susceptible to heat. Heating conditions for ink hardening have been an issue in wiring materials because they all required a heating process such as materials requiring heating at 50°C to 100°C for several minutes, and materials requiring heating to supplement hardening by UV irradiation.

### ■ World's First Commercial Product

This conductive silver ink commercialized by Tanaka Kikinzoku Kogyo for the first time in the world is a wiring material able to instantly form electronic circuits simply by being irradiated with UV light under room temperature conditions without heating due to optimization of the composition and mixture of resin containing silver nanoparticles and reaction initiator. As there is no need for the large equipment or thermal processing time required in thermal hardening, it is possible to significantly improve production speed per unit of area using an overwhelmingly small device space. A total of three silver inks using different types of resin and reaction initiator will be available, and users can select the materials according to their manufacturing equipment and application.

Tanaka Kikinzoku Kogyo will sell the product for some time as a sample for solar cell manufacturers, display manufacturers and printer manufacturers. The company will also work on technological improvements such as improving the electrical resistance of products while continuing to monitor trends in the industry aimed at the full-scale implementation of printed electronics expected to take place in the future.

### <Exhibits of the Product and Sample Boards>

Tanaka Kikinzoku Kogyo has scheduled to display this silver ink at the 41<sup>st</sup> INTERNEPCON JAPAN, which is Asia's largest exhibition for electronics manufacturing and mounting technologies, held at Tokyo Big Sight (Koto-ku, Tokyo) over three days from January 18 (Wed) until January 20 (Fri). In addition to the display of a flexible board upon which an electronic circuit has been actually formed using the product, technical personnel will also be on-site at the display booth (West 6-12) to respond to interviews.



Product sample of the silver ink to be released

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

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

Representative: Hideya Okamoto, President & CEO

Founded: 1885

Incorporated: 1918

Capital: 500 million yen

Employees in consolidated group: 3,456 (FY2010)

Net sales of consolidated group: 891.0 billion yen (FY2010)

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>

#### ■Tanaka Kikinzoku Kogyo K.K.

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

Representative: Hideya Okamoto, President & CEO

Founded: 1885

Incorporated: 1918

Capital: 500 million yen

Employees: 1,532 (FY2010)

Sales: 865.4 billion yen (FY2010)

Businesses:

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://pro.tanaka.co.jp>

### <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.

### <Press inquiries>

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