

October 15, 2021

TANAKA Precious Metals
TANAKA Holdings Co., Ltd.

TANAKA Develops Low-Temperature Sintering Nano-Silver Paste for Screen Printing

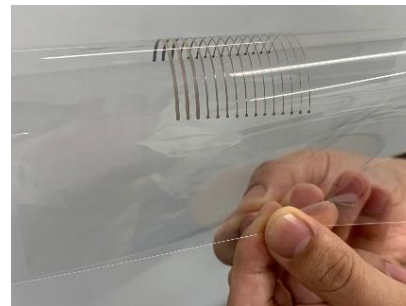
Enabling fine wire printing at 30 μm and less, with potential to further improve transparency and flexibility for electronic devices such as display devices and next-generation automotive window defoggers

TANAKA Kikinzoku Kogyo K.K. (Head office: Chiyoda-ku, Tokyo; Representative Director & CEO: Koichiro Tanaka), which operates the TANAKA Precious Metals manufacturing business, announced today that TANAKA has developed a [Low-Temperature Sintering Nano-Silver Paste for Printed Wiring](#) optimized for screen printing¹ and current availability of samples.

This product enables miniaturization, and improved bending resistance of wiring, for use in screen printing, which is a mainstream printing method used in the field of printed electronics². For this reason, **it is expected to be widely used for flexible devices such as smartphones and wearable devices that need bending resistance, and for improving transparency in window defoggers and other products for which demand will grow as electric vehicles become more popular.**



Nano-silver paste for screen printing



Wires printed on bendable organic substrate

Product Features

■ Paste suited to printing fine wires of 30 μm and less

Normally, the limit for printing wires in the screen printing process is about 50 μm in width. However, by combining suitable printers and screens with this paste, **it is possible to print fine wires (30 μm and less) directly onto glass**, which is a difficult medium for fine line printing, and onto other materials such as PET film³ and green sheets⁴. This will enable higher performance and improved productivity for electronic devices that require transparency, including window defoggers for next-generation vehicles and transparent antennas for 5G applications.

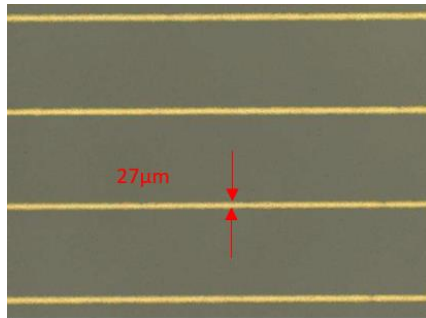
■ Bending resistance for printed wiring

Wires printed on PET film and other bendable organic substrates (100 μm printed wiring) were proven to show zero breakages over 100,000 cycles when subjected to a bending test with a bending radius of 0.5 mm. This product is therefore expected to be used for flexible devices

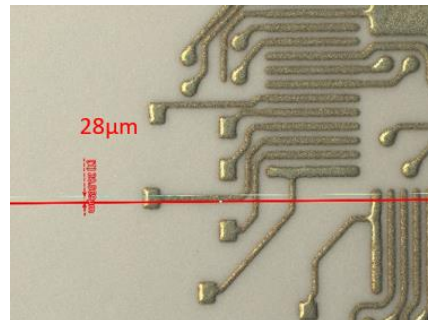
such as smartphones and wearable devices that need both flexibility and durability.

■ **Low resistance of 10 $\mu\Omega\text{cm}$ and less**

When sintered at heating temperatures of around 90°C, wires have a resistance value below 10 $\mu\Omega\text{cm}$, giving this product **unusually low resistance even for a low-temperature sintering nano-silver paste**.



Straight line pattern printing on glass



Packaging pattern printing on green sheet

■ **Nano-silver paste optimized for screen printing**

This printing paste consists of nano and submicron silver particles suited to screen printing, which is the most common printing method used in the field of printed electronics. The paste was successfully developed to create wires with good resistance to bending and **improved screen printing performance, through particle size control, solvent selection, and additives like polymer compounds, to optimize it for screen printing**. The use of fine wiring in using screen printing, which is a general printing process, is also expected to deliver improved productivity.

As a result of these advantages, this product is expected to contribute greatly to a range of electronic devices that will contribute to the IoT (internet of things) society, from fine wire heating technologies that prevent glass fogging (a need that is expected to increase as electric vehicles become more popular) to healthcare-related wearable devices and 5G-oriented transparent antennas that do not compromise the view.

Samples of the product are already available with the aim of starting mass production before the end of 2022.

1. Screen printing:

Used in the manufacturing processes of printed wiring boards, electronic components, flat panel displays, vehicle meters and other devices, this is an essential printing method in the field of electronics.

2. Printed electronics:

This technology, employing functional inks and various printing technologies, is used in the manufacture of electronic devices on glass and polymer substrates. Used in products such as organic electroluminescent (EL) displays, wearable devices, sensors, digital signage, and electronic paper, it is a promising basic technology for creating the IoT society.

3. PET film:

Polyethylene terephthalate (PET) film is a polymer film with outstanding heat resistance and strength. It is used to protect the surface of devices like liquid crystal TVs, as a backlight reflective film for devices like notebook computers, and as a substrate for wearable devices.

4. Green sheets:

These ceramic substrates, in a flexible unfired state, are used for circuit boards.

■About TANAKA Precious Metals

Since its foundation in 1885, TANAKA Precious Metals has built a diversified range of business activities focused on precious metals. TANAKA is a leader in Japan regarding the volumes of precious metals handled. Over the course of many years, TANAKA has not only manufactured and sold precious metal products for industry but also provided precious metals in such forms as jewelry and assets. As precious metals specialists, all Group companies in Japan and around the world collaborate and cooperate on manufacturing, sales, and technology development to offer a range of products and services. With 5,193 employees, the group's consolidated net sales for the fiscal year ended March 31, 2021, was 1,425.6 billion yen.

■ Global industrial business website

<https://tanaka-preciousmetals.com/>

■ Product inquiries

TANAKA Kikinzoku Kogyo K.K.

<https://tanaka-preciousmetals.com/en/inquiries-on-industrial-products/>

■ Press inquiries

TANAKA Holdings Co., Ltd.

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