PRESS RELEASE

April 3, 2018

Tanaka Precious Metals

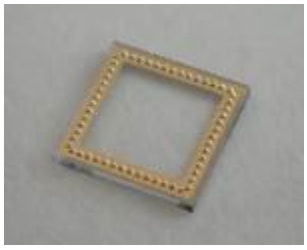
Tanaka Holdings Co., Ltd.

TANAKA Begins Sample Shipments of SKe-Lid Glass Lids Made of Quartz with AuSn for Deep Ultraviolet LEDs

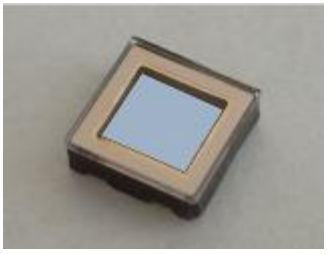
Controlling cracks and metallization separation in applications such as semiconductor lasers and automotive sensor devices raises productivity and reduces costs

Tanaka Holdings Co., Ltd. (Head office: Chiyoda-ku, Tokyo; Representative Director & CEO: Akira Tanae) announced today that Tanaka Kikinzoku Kogyo K.K. (Head office: Chiyoda-ku, Tokyo; Representative Director and CEO: Akira Tanae), which operates the Tanaka Kikinzoku Group's manufacturing business, began sample shipments of SKe-Lid, a newly-developed glass lid made of quartz with gold-tin (AuSn) for use with deep ultraviolet[1] light emitting diodes (LEDs).

Deep ultraviolet LEDs are a next-generation light source expected to replace mercury lamps and have various applications including water disinfection in industry and air disinfection systems in healthcare. When used in combination with quartz glass, which has high transmissivity of deep ultraviolet wavelengths, and AuSn sealant, which has excellent airtightness and durability, however, problems with cracking of the quartz glass and metallization[2] separation can occur. These glass lids, made of quartz glass with AuSn solder, employ proprietary Tanaka Kikinzoku Kogyo technologies that properly control the shape and dimensions when applying the AuSn sealant to the quartz glass, making it possible to control cracking and metallization separation. Higher yields are expected to contribute to improved productivity and lower costs.



Exterior of SKe-Lid



Exterior of SKe-Lid after application of sealant (with ceramic package)

■ Advantages of Ske-Lid

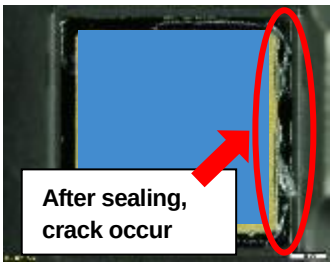
・ By using SKe-Lid as a cover material for quartz glass (also compatible with glass with AR codes), the transmissivity of high-output deep ultraviolet LEDs can be increased.

・ When using quartz glass with AuSn, the AuSn solder is already applied to the glass, facilitating the positioning with the ceramic package during sealing.

・AuSn airtight sealing raises reliability and durability.

・ The use of proprietary technology controls the formation of cracks during application of AuSn to quartz glass with high transmissivity of deep ultraviolet wavelengths and ceramic package sealing.

Because of these advantages provided by Ske-Lid, it is expected to contribute to higher productivity and lower costs of final products in the deep ultraviolet LED market, which will require higher outputs and reliability in the future. As the shift to SMD[3] proceeds and advances are made in autonomous vehicles, AuSn sealing will likely be used in semiconductor lasers, which require high reliability and durability, and devices that require transparent covering materials such as automotive sensors.



Earlier Quartz Glass with Gold-Tin Sealant
(Quartz glass after gold-tin sealing with cracks)

Newly Developed Ske-Lid Quartz Glass Lid with Gold-Tin
(Quartz glass after gold-tin sealing has no cracks)

■ Background to development

As a result of the Minamata Convention on Mercury coming into effect in August 2017, development of deep ultraviolet LEDs is proceeding as a replacement for mercury lamps used for water and air disinfection. When deep ultraviolet LEDs are manufactured using conventional resin sealants, the ultraviolet rays cause degradation of the resin sealants, resulting in deterioration of device properties and lifespan. Also, when AuSn solder, which is highly resistant to ultraviolet rays, is used as the sealant material, cracks occur in the quartz glass and metallization separation occurs due to thermal expansion between the package ceramics, window quartz glass, and AuSn sealant, giving rise to low yields.

Tanaka Kikinzoku Kogyo adopted proprietary technologies that adequately control the shape and dimensions when applying AuSn sealant to quartz glass and successfully developed a high-quality quartz glass lid with AuSn that monitors the occurrence of cracking and produces an airtight seal. Ske-Lid was developed with cooperation from Kyocera Corporation, Yamamura Photonics Co., Ltd., and Asahi Glass Co., Ltd., which provided the glass material and ceramic package material, and CROSS OSAKA Co., Ltd., which performed the seal testing.

Tanaka Kikinzoku Kogyo will display Ske-Lid at the OPTICS & PHOTONICS International Exhibition 2018 (OPIE ’18) at the Pacifico Yokohama from April 25 to 27.

Cooperating Partners
Kyocera Corporation: ALN ceramic package
Asahi Glass Co., Ltd.: LTCC (GCHP™) ceramic package
Yamamura Photonics Co., Ltd.: Quartz glass
CROSS OSAKA Co., Ltd.: Seal device evaluation

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[1] Deep ultraviolet: Also referred to as UVC. Has a wavelength from 250 nm to 280 nm. Has strong disinfecting effects.

[2] Metallization: A technology for coating non-metallic surfaces with a metal. Ceramics and other materials that have been metalized form an electric circuit and are used during soldering and for different applications.

[3] SMD: An abbreviation for surface mount device. Refers to electronic components manufactured in such a way that they can be mounted merely by soldering them to the surface of a printed circuit board. SMDs make it possible to miniaturize and increase the density of electronic components such as LED chips.

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

Headquarters: 22F, Tokyo Building, 2-7-3 Marunouchi, Chiyoda-ku, Tokyo
Representative: Akira Tanae, Representative Director & CEO
Founded: 1885 Incorporated: 1918* Capital: 500 million yen
Employees in consolidated group: 5,120 (FY2016)
Net sales of consolidated group: 1,064,259 million yen (FY2016)
Main businesses of the group:
Strategic and efficient group management and management guidance to group companies as the holding company at the center of the Tanaka Precious Metals.
Website: http://www.tanaka.co.jp/english (Tanaka Precious Metals),
http://pro.tanaka.co.jp/en (Industrial products)
* Tanaka Holdings adopted a holding company structure on April 1, 2010.

■Tanaka Kikinzoku Kogyo K.K.

Headquarters: 22F, Tokyo Building, 2-7-3 Marunouchi, Chiyoda-ku, Tokyo
Representative: Akira Tanae, Representative Director & CEO
Founded: 1885 Incorporated: 1918 Capital: 500 million yen
Employees: 2,269 (as of March 31, 2017)
Sales: 1,059,003.329 million yen (FY2016)
Main businesses:
Manufacture, sales, import and export of precious metals (platinum, gold, silver, and others) and various types of industrial precious metals products.
Website: http://pro.tanaka.co.jp/en

<About the Tanaka Precious Metals>

Since its foundation in 1885, the Tanaka Precious Metals group 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 Precious Metals has not only manufactured and sold precious metal products for industry but also provided precious metals in such forms as jewelry and resources. As precious metals specialists, all Group companies within and outside Japan work together with unified cooperation between manufacturing, sales, and technological aspects to offer products and services. Besides, to make further progress in globalization, Tanaka Kikinzoku Kogyo welcomed Metalor Technologies International SA as a member of the Group in 2016.

As precious metal professionals, Tanaka Precious Metals will continue to contribute to the development of an enriching and prosperous society.

The five core companies in the Tanaka Precious Metals are as follows.
- Tanaka Holdings Co., Ltd. (pure holding company)
- Tanaka Kikinzoku Kogyo K.K.
- Tanaka Denshi Kogyo K.K.
- Electroplating Engineers of Japan, Limited
- Tanaka Kikinzoku Jewelry K.K.

<Press inquiries>
Tanaka Holdings Co., Ltd.
https://www.tanaka.co.jp/en/protanaka/inquiry/index.php