

Tanaka's High Thermal Conductivity Adhesives Fit Die Bonding Process

Tanaka Kikinzoku Kogyo K.K. supplies a wide array of materials, such as platinum, palladium, gold, silver and other precious metal pastes, powders, and conductivity adhesives (for semiconductor die bonding). These materials are extremely versatile for various applications, including industrial products and electronic parts or components. Among others, silver (Ag) paste, a high thermal conductivity adhesive, is drawing attention as a die-bonding material for a number of applications, including power semiconductor devices and light-emitting diode (LED) lighting devices. The features of the Ag paste are as follows: 1) low cost and stable supply are realized by the integrated production from Ag powder material to paste production



Hiroshi Kawabe,
Sales Representative,
Paste Section



Akio Nagaoka,
Section Chief Manager,
Paste Section



Rikia Furusho,
R&D Manager, Paste
Section



Appearance of Ag adhesive paste products

and recycling; 2) thanks to its low elastic modulus, high reliability is guaranteed; and 3) paste that meets each individual customer's requirements can be supplied through the company's well-thought-out technical services in which development, manufacturing, and sales are integrated.

ing a high operating rate. In addition, the company also offers high heat resistant products that can be applied to the re-flow process of substrates.

Stringent Process Control

At the company's Shonan Plant that manufactures the Ag paste, the production is performed under strict control of the processes in terms of temperature, humidity, and cleanliness and the product quality, so as to be able to supply stable products whose quality will not vary from one production lot to another. As regards the durability of the products, Tanaka Kikinzoku Kogyo conducts 1000-cycle heat shock tests at temperatures ranging from minus 50°C to plus 150°C in order to guarantee their high reliability.

When a user uses the Ag paste, the paste is defoamed so that no air bubbles or voids may be generated in an adhesive layer after bonding. In addition, preventing impurities and foreign materials from entering the paste will contribute to boosting yield.

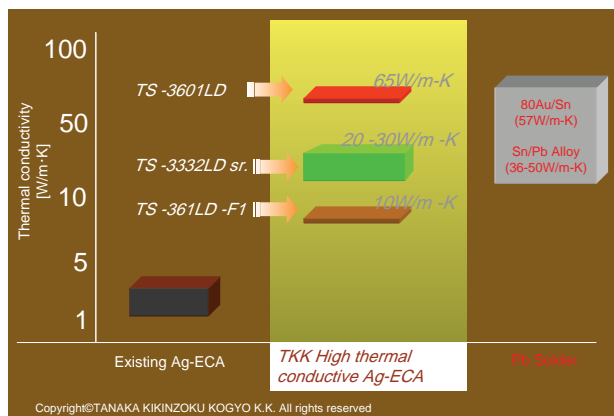
In order to reduce the quality variation during transfer, the company adopts dry ice packing and monitors a temperature profile all the way from the plant to a user, thereby ensuring low-temperature delivery.

As mentioned above, Tanaka Kikinzoku Kogyo maintains high quality and high reliability of its products by meeting each individual customer's requirements meticulously through a concerted effort. □

With Low Volume Resistivity

The company's high thermal conductivity Ag adhesive paste products come in three series: the TS-361LD Series with a thermal conductivity of 10 W/m·k; the TS-333LD Series with that of 20 to 30 W/m·k; and the TS-3601LD Series with that of 65 W/m·k. All of these series feature lowest volume resistivity ranging from 10 to 25 μΩ·cm. Furthermore, Tanaka Kikinzoku Kogyo also adds a low elastic modulus Ag adhesive paste product that has an elastic modulus of 100 MPa to the product line.

For various types of die bonding processes, paste viscosity is optimized by controlling the distribution of Ag metal particles and adjusting the adhesive composition, ensur-



High thermal conductive adhesion

| Name | * Representation value | | | |
|----------------------|------------------------|-----------------------|-----------------------|-----------------------|
| | TS3332LD | TS3334LD-40 | TS3601LD-35 | TS361LD-F1 |
| Commercial Product | | | | |
| Thermal Conductivity | 23 W/m·K | 30 W/m·K | 65 W/m·K | 10 W/m·K |
| E-Modulus 1/ at RT | 9,000MPa | 7,900MPa | 20,000MPa | 11,000MPa |
| at 250C | 690MPa | 980MPa | 3,900MPa | 360MPa |
| Viscosity 2/ | 30 Pa.s | 40 Pa.s | 35 Pa.s | 50 Pa.s |
| Viscosity 3/ | 11 Pa.s | 15 Pa.s | 15 Pa.s | 25 Pa.s |
| Volume Resistivity | 25 μΩ·cm | 17 μΩ·cm | 10 μΩ·cm | 15 μΩ·cm |
| Tg 4/ | 84 C | 96 C | | 61 C |
| CTE α 1 | 27 ppm/C | 25 ppm/C | 28 ppm/C | 35 ppm/C |
| CTE α 2 | 19 ppm/C | 28 ppm/C | 58 ppm/C | 94 ppm/C |
| DSS 5/ | 27 N/mm ² | 17 N/mm ² | 15 N/mm ² | 22 N/mm ² |
| Hot DSS 6/ | 1.4 N/mm ² | 2.2 N/mm ² | 2.1 N/mm ² | 1.1 N/mm ² |
| RF DSS 7/ | 24 N/mm ² | 16 N/mm ² | 14 N/mm ² | 23 N/mm ² |

1) SI, DMS8000 2) BF, RVT 10rpm 3) HAAKE, 10s 4) by TMA
5) Si chip □2mm/ Ag LF 6) On hold 260C, 1min 7) 260C, 1min, → RT
Copyright©TANAKA KIKINZOKU KOGYO K.K. All rights reserved

Technical data sheet

Precious Metals Technology : Your Gateway to the Future.

Technology to develop new forms of energy and products is the key to solving a variety of the problems faced around the world today.

Established in 1885, Tanaka Precious Metals Group has contributed to the development of a wide range of industries through its precious metals technology.

Adhering to the beliefs we have held since our inception, we continue to lead the way in green technology innovation by realizing the full potential of precious metals in order to realize an affluent society.



Green Technology

Tanaka Kikinzoku International K.K

| | |
|--------------------------------|------------------------|
| Head Office (Tokyo Marunouchi) | TEL : +81-3-5222-1380 |
| Seoul Branch | TEL : +82-2-588-1854 |
| Hong Kong Branch | TEL : +852-2736-0011 |
| Singapore Branch | TEL : +65-6778-4411 |
| Taipei Branch | TEL : +886-2-2536-2053 |
| Kaohsiung Sales Office | TEL : +886-7-223-5215 |
| Manila Representative Office | TEL : +63-2-631-2726 |
| Malaysia Representative Office | TEL : +60-4-642-9950 |

Tanaka Kikinzoku International (Shanghai) Co.,Ltd.

| | |
|------------------------|-------------------------|
| Head Office (Shanghai) | TEL : +86-21-6448-5988 |
| Shenzhen Branch | TEL : +86-755-2588-2500 |

Tanaka Kikinzoku International (America), Inc.

| | |
|----------------------------|-----------------------|
| Head Office (Indianapolis) | TEL : +1-317-598-0796 |
| San Jose Branch | TEL : +1-408-779-0461 |

Tanaka Kikinzoku International (Europe) GmbH

| | |
|-------------------------|----------------------|
| Head Office (Frankfurt) | TEL : +49-69-2193870 |
|-------------------------|----------------------|

Tanaka Kikinzoku International (Thailand) Co.,Ltd.

| | |
|-----------------------|----------------------|
| Head Office (Bangkok) | TEL : +66-2-652-5180 |
|-----------------------|----------------------|



TANAKA
The Future is Precious.

Dempa
AEI
 ASIA ELECTRONICS INDUSTRY

TECH FOCUS:

DSSP Lifts Downscaling to Next Level

Renesas' IC Gives Mass Appeal to High-End GPS

INDUSTRY REPORT:

Taiwan PCB: Silver Lining in Lukewarm Market



SPECIAL REPORT:

PCB Materials, Process Get Green Stamp

NOVEMBER 2011

A **Dempa** PUBLICATION ISSN 1342-422X

Visit us at
 China Hi-Tech Fair **ELEXCON**
 Booth #2601