



December 2012

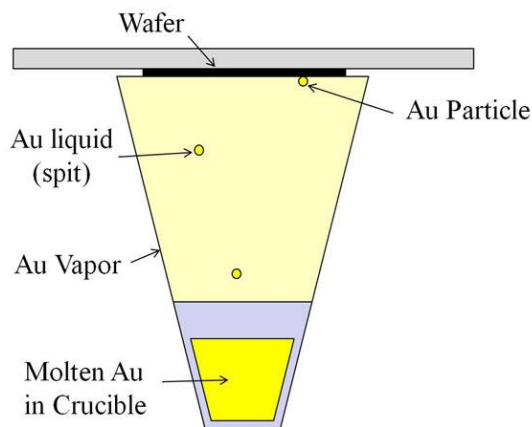
**Thin Film Deposition
Materials &
Electronic Packaging
Products**

Why Gold Spits During Evaporation & How We Can Help

Evaporation is a physical vapor deposition (PVD) process whereby material is transformed into the vapor phase using thermal energy to enable the deposition of a thin film on a substrate, often a wafer. It is a key technology employed to manufacture devices such as power amplifiers used in wireless handsets and for high brightness light emitting diodes (LEDs). Gold is one of the principal materials evaporated. Unfortunately, it can be prone to a behavior known as spitting. Spitting involves the ejection of liquid droplets from the molten pool of metal instead of the smooth transfer of material through evaporation (See figure).

A certain fraction of these liquid droplets land on the deposition wafer where they solidify into solid particles. These particles constitute a defect since they can lead to the improper functioning of a microelectronic circuit. Spitting therefore negatively affects yield due to the scrapping of partial or whole production lots. There are many factors that can affect spitting and can be divided into two broad groups: 1) process conditions, and 2) material quality. Process conditions include power input, heat transfer, crucible liner user, E-Beam sweep pattern, ramp profiles and deposition rates. Material quality is determined by both purity and cleanliness.

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Much to Celebrate! One Year After Materion-Singway Partnership

In the year since Materion Corporation signed a distribution agreement with Singway Technologies Co., Ltd., the relationship has flourished. By bringing together Materion's precious and non-precious thin film deposition material expertise with Singway's precious metal value-added services, we have

In This Issue

[Singway Partnership](#)
[Bimetals & Trimetals](#)
[Albuquerque Expansion](#)
[Flange Materials](#)
[Materion Singapore](#)



[Contact Us](#)
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Continuous Improvements

Anti Money Laundering Compliance Program

As an ethical corporate citizen and trusted refiner of precious metals since 1907, Materion prohibits money laundering and is proactive in preventing acts designed to conceal proceeds that could support terrorist or criminal activities. The company has recently expanded its worldwide Anti-Money Laundering

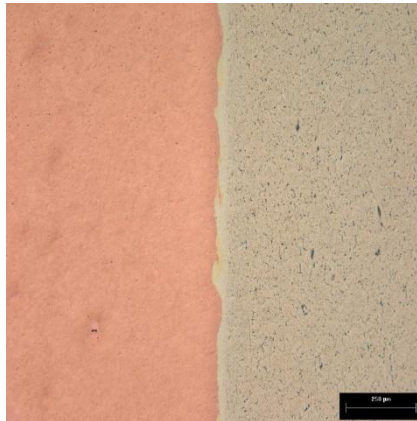
substantially increased support to the Wireless and LED manufacturers of Taiwan. This has meant streamlined material management services and an overall lower cost of precious metal ownership for our customers.

After one year of working together, there has been a dramatic upturn in sales of thin film material used in LED/Wireless markets. In a recent development, Materion's gold (Au) slug has been fully qualified for a company in Taiwan where engineering feedback indicates our material is producing good yields and requires much less power to achieve the same rate of evaporation as competitor's. It is expected that the gold slug demand will continue to rise.

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Innovative Bimetals & Trimetals Products

With its specialized expertise in precious metals materials, Materion is now offering new innovative Bimetal and Trimetal products. Our engineers have developed a proprietary process that offers precise ratios, customized aspect ratios and is suitable to produce a wide variety of alloys. Available in wide widths, these products deliver extra clean interfaces to help ensure a strong bond for our customer's use in joining applications.



Our unique Trimetal products are composed of a braze alloy intimately bonded on both sides of a copper core. This is produced in strip form for our customers who are then able to stamp flat preforms in either disc or washer format as required. Preforms are used extensively in the joining of carbide cutting tools to steel tool holders with the copper core acting as a "shock absorber" for the cutter in service. This is advantageous for promoting the life of the tool bit and creating a more robust joining system. Because the braze alloy is on both sides of the core, the bond strength is equal and the amount of silver braze is reduced by 50% compared to a solid braze preform. Consequently, Materion's Trimetal products benefit our customers in several ways - extending tool lifetime and lowering precious metal costs.

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Capacity Expansion at Materion Albuquerque

Materion's Mesa del Sol, New Mexico (Albuquerque) facility is enlarging its precision parts cleaning operation with new chemical production lines to meet growing demand. The expansion is the result of recent successful cleaning qualifications for key PVD customers. This development, along with Materion Microelectronics & Services recently expanded site in Wheatfield, New York, creates convenient regional service from East to West coasts.

The increased capacity, coupled with flexible cleaning techniques, will continue to provide Materion customers an industry-leading cleaning service

(AML) Program by forming a new Anti-Money Laundering Compliance Team, led by Vice President of Finance Joseph Kelley.

Their responsibility is to ensure that employees remain particularly vigilant with respect to screening existing and potential customers and their scrap and/or primary sourced materials for anti-money laundering compliance. The objective is for the staff to be thoroughly grounded in AML screening procedures, and thus able to recognize unlawfully derived proceeds that have been disguised from their true origins so as to appear legitimate. Per Materion's AML policy, successful completion of compliance training is required for all worldwide employees involved in any precious metals business or transactions.

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Face to Face Around Materion



Materion welcomes Dan Hoffman, our new Vice



provider. Materion offers competitive lead times, with ability to positively impact lower cost of ownership through extending effective part life. The Mesa del Sol operations will support customers in such technically demanding industries as: Wireless, LEDs, Medical, HDD, Semiconductor, Data Storage, Optics and Photovoltaics. [Read More...](#)

President of Operations, Advanced Materials Group (AMG). Reporting directly to Don Klimkowicz, President, Materion AMG, Dan brings his wealth of experience to lead group operations and interface with Materion corporate.

To familiarize himself with operations and people, Dan will be traveling to all AMG locations while maintaining his residence in the Spokane, Washington area until 2013. At that time, the Buffalo facility will be his primary office.

In describing his excitement at coming to Materion, Dan says he is looking forward to building AMG into an extremely competitive and profitable operation that leaves a performance legacy that will stand the test of time. He "believes strongly in the power of people to bring creative ideas and solutions to tough problems" and that the "talent in AMG is extraordinary and capable of achieving these goals."

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Flange Materials - Now & the Next Generation

Materion manufactures ceramic packages designed to house high power transistors that amplify radio frequency (RF) signals. Our packages are used in amplifiers found in base stations for cell phones, broadcast TV and radio. The most popular type of RF power transistor for the commercial cell phone base stations is called Si LDMOS. These transistors are soldered directly onto a Ni and Au plated flange - an Air Cavity Ceramic package. Examples of Air Cavity Ceramic packages manufactured by Materion are shown in Figure 1. When soldered into a package, the LDMOS transistor chip is surrounded by a metalized ceramic frame. Two or four plated leads are brazed onto the ceramic in order to conduct the input and output signals. The flange is bolted or soldered onto a heatsink which is electrically grounded. [Read More....](#)



Close to You: Materion Singapore

To better serve our customer base in Asia, Materion has expanded its local operations in Singapore. This proximity provides the convenience of technical and sales assistance immediately on-hand and allows more opportunity to partner for growth. To meet the needs for products and services supporting the semiconductor, LED, and wireless industries, Materion Advanced Materials Technologies & Services, Far East Pte Ltd. now has two strategically located facilities.

The factories (Woodlands and Lion) possess a broad range of technical capabilities and manufacture diverse products such as evaporation gold slug (EVAPRO™ V), a variety of alloys for sputtering target substrates, traditional microelectronics covers (Combo-Lids™) and fine gold (Au) bonding wire. They also provide sputtering target bonding services, machining of small PVD



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targets, and assembling, inspection & testing of Radio Frequency (RF) packages.

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Happy Holidays



*From all of us here at Materion, Happy Holidays
and
We wish you the the very best for the New
Year!*

MATERION MICROELECTRONICS & SERVICES

2978 Main Street
Buffalo, NY 14214
Phone: +1 716.837.1000
www.materion.com/microelectronics

USA: +1 716.837.1000

Europe: +44 0 488.686056

Asia: +65 6559.4450

