

MATERION ADVANCED MATERIALS GROUP

April 2014

LEDs, Semiconductors and Precious Metals...

Precious Metals in LED Manufacture



Gold and Gold Alloy Advantages

Precious metals are essential in the manufacture of LEDs and are critical to extend the lifetimes of high power and high reliability devices.

PVD Manufacture

The gold and gold alloys used to manufacture LEDs are often deposited by physical vapor deposition (PVD). Materion has developed pure precious metals and custom alloys ideal for the PVD manufacture of these devices.

We offer precious metal sputtering targets with purities up to 5N, ultrafine grain sizes and consistent microstructures to ensure deposited film consistency and uniformity.

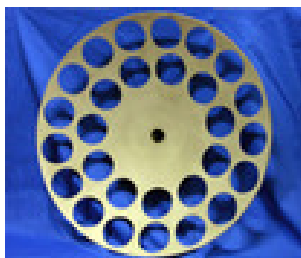
Specialty Target Designs and High Grade Materials

In addition, Materion has developed precious metal sputter target designs to extend the life of the and to maximize target utilization per troy ounce of gold in the target. For evaporation materials, we have developed our Evapro® grade materials that represent industry-leading performance with low defects in films. [Read more about Au sputter targets...](#)

Minimizing Costs of Precious Metals in Compound Semiconductor Manufacturing

Benefits of Improved Shield Kit Cleaning

Precious metals, such as Gold (Au) and Platinum (Pt), are commonly employed in the manufacture of compound semiconductor devices. However, Au and Pt represent a significant cost to the manufacturer due to the high percentage of the metal that is deposited onto the surfaces of the chamber and internal fixtures during the evaporation or sputtering process. Although this material is recoverable, the choice of recovery techniques can directly impact the precious metal recovery yields.



Maximize Metal Recovery

It is important to recover the maximum amount of Au and Pt from the shield kit to minimize total cost of ownership. Materion has developed proprietary chemical processes that offer distinct advantages over traditional shield kit cleaning. The comparative advantages and disadvantages of the cleaning methods will be discussed in this article.

[Read about how Unrecovered Output Increases Costs...](#)

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Contact Us
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Gold Products - Conflict-Free



"All of our gold products are conflict-free," confirmed Don Klimkowicz, President of Materion Advanced Materials Group. "We are proud of our long history of social and environmental accountability and our qualification as a Certified Conflict Free Gold Refiner." With more than 100 years of experience in refining precious metals, Materion is committed to responsible stewardship and the use of conflict-free minerals in all our products.

[Read about Materion's Conflict-Free status...](#)

**Face-to-Face Around
Materion**

LED and Wireless Market Update



Report on Industry Growth **LED Market Increasing**

The general illumination market is by far the largest volume application for LEDs and will continue to grow in a variety of markets. Between 2012 and 2013, the worldwide market for all LEDs increased by 7%. LED sales in 2013 were \$14.4B worldwide. 2013 also marked the year that white light LEDs achieved a

performance/price ratio sufficiently high enough to appeal to US consumers. For the consumer, LEDs offer longer lifetime, the ability to be dimmed, and superior energy efficiency. Demand for LEDs is also being assisted by legislation passed by governments around the world. For example, on January 1, 2014, the manufacture of traditional 40W and 60W incandescent light bulbs was discontinued in the US.

High Power LEDs

The fastest growing segment within the general illumination market will be for high power LEDs, defined as >5 W input power and >400 lumens output. According to Strategies Unlimited, sales of these highest power LEDs will grow by a CAGR of 57% between 2013 and 2018. Such LEDs are used to illuminate outdoor spaces (roads, parking lots, sidewalks, parks) as well as large indoor spaces like parking garages and warehouses.

[Read about the Mixed Growth for Wireless Handsets...](#)

RESTART Program Expanded

Chromium and Nickel Now Included

In managing your specialty metals, achieving a lower cost of ownership is a desirable goal. Materion Advanced Materials Group's RESTART Program will help you do just that - by rethinking spent target disposal and employing novel recycling technologies. In addition to Tantalum, we are now processing Chromium and Nickel.



What is Materion RESTART?

RESTART stands for "Rare Element Supply Tactics & Resource Transformations." It seeks to capture end-of-life, high purity metals for reuse while maintaining their purity and quality. By recycling sputtering target scrap streams, it preserves the industry's limited resources and reduces supply constraints.

[Read about the Rising Costs of Raw Materials....](#)

Customized Products Developed for Specific Applications

Materion Meets Customers' Technology Demands



Dr. Richard Koba has been with Materion for seven years and is now Co-Product Manager for Ceramic Packages as well as Market Segment Manager for Wireless and LEDs. His office is at the Tyngsboro, MA facility. Rich reports to EJ Strother, Vice President of Marketing for Advanced Materials Group. In his current management role, Rich champions the position "...that Materion must continuously invest in developing new products and services in order to stay one step ahead in technology."

Rich holds two degrees: a B.S. in Ceramic Engineering from Ohio State University and a Ph.D in Ceramic Science from Penn State University.

As an active member of IMAPS (International Microelectronics & Packaging Society), Rich participates in conferences and events that focus on critical technologies. [Read more about Rich....](#)



[Stop by Materion](#)

Whatever your product need or industry, from semiconductors to packaging products to special alloys, Materion can meet your design requirements. Following are some examples of how we address our customer product challenges...



Microelectronic Packaging: Unique Edge Metallization

When our customers' needed a non-magnetic hermetically sealed lid, Materion created the Ceramic Combo-Lid™. We produce these high performance lids through use of our unique edge metallization process and are the only manufacturer currently providing this process.

Recently, to further assist a customer with a specific requirement, we developed fillet formation on the lid. Our metallization process creates effective organic-free seal rings that allow excellent soldering, while a tack-welded gold-tin alloy delivers perfect hermetic sealing. Other non-precious and lead-free soldering can also be used. Our process assures high performance and quality for microelectronics packages.

[Read about our Prototyping of Innovative Precious Metal Alloys...](#)

Booth #116

Society of Vacuum Coaters TECHCON to learn more about Materion products supporting vacuum coating applications.

**May 3-8, 2014
Chicago, Illinois**



Platinum Sponsor, Materion

will be joining the international body of industry experts at

CS MANTECH

**May 19-22, 2014
Denver, Colorado.**

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