

# Stats & Chats

Essential Information from our Industry Experts

Semiconductor Packaging  
Products & High Purity  
PVD Materials

December 2013

## Implications of Impurities in Sputter Targets & Evaporation Sources

*Interpreting Material Purity*



Sample Sputtering Target lots.

All sputter targets and evaporation sources contain impurities. It is neither practical nor economically feasible to manufacture 100% pure materials. Understanding how pure a material is, how to interpret material impurities quoted, and which impurities are important to a particular application is critical in selecting materials and for ensuring processed stability over multiple

### Determining True Purity Value

Many targets and sources are shipped with a certificate of analysis listing only a handful of elements that were tested. The true value of the overall impurity concentration is therefore unknown. The reason for this is pragmatic – assaying all elements is expensive. So to control costs, vendors limit the assays to elements known to be important to their customer applications.

When an overall purity is quoted, it is essential to understand how purity is defined when specifying materials. For example, when a material is quoted as being 99.99% pure (or 4N), the *true value* of the concentration of impurities is often not the same as the *declared value*. This is largely because, depending upon the specifications, manufacturers may not be required to test all possible elemental impurities. [Read more about material purity...](#)

## Materion Advanced Materials Group

*Business Units Consolidated*

The Materion Business Units Microelectronics & Services and Advanced Chemicals have combined to form the Materion Advanced Materials Group. This consolidation will reduce the cost and complexity of operations and enable us to focus on the areas that are most important to you, including committing additional resources to developing new technologies and services.

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### Materion Gains "Conflict-Free" Gold Refiner Status



The Buffalo, New York facility of Materion has been certified as a Conflict-Free Gold Refiner and is in compliance with the Conflict-Free Smelter (CFS) Program protocol of the Conflict-Free Sourcing Initiative and now qualified for [CFS Listing](#). This certification

You should see:

- \* Shorter response times
- \* Improved delivery systems
- \* Higher quality products and services
- \* Rapid new product development

Materion Advanced Materials Group is passionate about improving our customer's experience and will continue to support your business with a broader range of services, high quality products and specialty materials.

## Silver Alloys as a Reflection Layer in LEDs

*Materion Silver Alloys Provide Superior Alternative*



Because silver offers excellent reflective properties across the visible and near infra-red light spectrum, it is an ideal candidate material for applications that require reflective coatings. A thin layer of no more than 100 nm is sufficient to maximize its reflectivity. Thicker layers do not increase reflectivity and can add to the cost of manufacturing.

### Silver Use in LEDs

One application for silver is in light-emitting diodes (LED), a growing technology and market for general illumination. Silver is used as the backside reflective layer on the LED chip. Its purpose is to reflect stray light back in the intended forward direction. Silver can also be used to coat the surfaces of the submount and reflector in which the LED chip is placed. In order for LEDs to be cost competitive, it is important that all generated photons be steered in the appropriate direction.

### Advantage of Silver Alloys

With all of its excellent properties, there is a downside to pure silver. Although it does not oxidize easily, it is susceptible to environmental degradation through such factors as high humidity and high temperature exposure. (See [Chart](#): The degradation work was co-developed with Tell-Nexx, a Div. of Applied Materials.) This can result in the formation of sulfide tarnish. Therefore, pure silver is not the ideal choice of material for use in LED reflective layers, due to its potential loss of reflectivity from tarnishing. [Read more about silver alloys...](#)

## Stiffer Than Titanium, Lighter Than Aluminum!

*Materion AlSiC Offers Multiple Advantages*

demonstrates Materion's commitment to conducting business in a manner that protects people and the environment. Through CFS certification, Materion validates that the gold-containing products we supply are derived from conflict-free sources. Under the CFS Program, an independent third-party evaluates smelter and refiner procurement activities and verifies that relevant materials are from conflict-free sources. [Read more...](#)

### "Partner of Year" - Materion Honored by International Rectifier

Materion was presented with the "Partner of the Year Award" by International Rectifier (IR®), a world leader in power management technology.

The award recognized Materion's achievements in the category of fabrication materials as a supplier of high-quality, cost-effective wafer fabrication materials.

[Read more...](#)

### Face to Face Around Materion



Materion would like to introduce Christopher

Materion is the supplier of the SupremEXR family of metal matrix composites. These composites, known as AlSiC, are comprised of silicon carbide (SiC) ceramic particles dispersed in an aluminum (Al) matrix. In May 2012, we acquired Aerospace Metal Composites (AMC) of Farnborough, UK to expand the manufacture and development of SupremEX®. These materials can be hot isostatically pressed (HIP'd), forged, rolled and extruded into complex shapes.

#### Advantages of SupremEX®

- > Stiffer than titanium, lighter than aluminum
- > High temperature durability
- > Easily machined
- > Stable, capable of high precision tolerance designs

SupremEX® is optimized for mechanical applications of AlSiC, such as automotive and aircraft parts. Additionally, AlSiC can be formulated for thermal management applications such as semiconductor packaging. [Read more on AlSiC...](#)

## RESTART™ with Materion

*Rethink spent target disposal - Recycle valuable materials!*



Today's supply chain managers are faced with the difficult task of balancing quality, performance, and profitability in an environment of escalating prices and supply constraints. Materion's RESTART™ program provides solutions to these challenges in a manner that

preserves valuable material resources for use within our industry. RESTART™ stands for Rare Element Supply Tactics and Resource Transformations.

#### Recycling High Purity Metals

Currently, valuable metals prices are on the rise due to several supply chain issues such as regulations, increased demand, and poor end-of-life management. These factors contribute to valuable metals being sold off into adjacent industries where the resource becomes unavailable. With RESTART™, Materion captures end-of-life, spent sputtering targets for reuse.

**Tantalum, Chromium and Nickel** As part of the initial phase of RESTART™, Materion offers Tantalum, Chromium and Nickel alloys. Unique processes have been developed for each of these materials, allowing them to be recycled while maintaining customer-specified purity levels. RESTART™ materials are currently approved for use in the semiconductor, optics, security, and hard disk drive industries. [Read more about the RESTART™ program...](#)



Array of photoetched AlSiC lids.

**Johnson** from our Albuquerque, NM facility. Chris has been with the company for three years and is currently Marketing Manager for Semiconductor and Industrial industries. His position is focused on setting a global market strategy that gains market share, develops new products, fosters organic growth, and explores new markets. Chris reports to Edward Strother, VP of Marketing, and has worked at a number of our facilities.

Chris has an educational and work background that strongly supports his position. He graduated with BA in Finance from New Mexico State University and an MBA from the University of New Mexico and has had diverse experience in Product Management, International Sales Management and Business Development.

[Read more...](#)

**Compound Semiconductor**



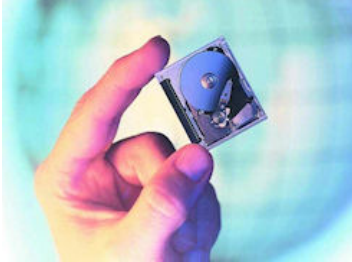
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**March 18-19, 2014  
Frankfurt, Germany**

## What's Next - Digital Storage Wars?

*Materion Supplies Magnetic Material for Solid State Storage*

There has been more storage of data in the last five years than in all previous history. It is expected that the digital universe (all digital content created) will double ever two years through 2020. While the sheer volume of digital content is mindboggling, so is the swift evolution of uses and devices for storing it.



### Emerging Types of Storage

Innovative memory storage applications are rendering existing solid-state storage less attractive - and eventually obsolete. Both DRAM and NAND Flash are widely thought to be approaching the end of their evolution. One of the leading candidates to emerge from the R&D lab to semiconductor production fabrication is Spin Torque Transfer Random Access Memory (STT-RAM). The heart of this technology is a magnetic memory storage cell.

### Materion and STT-RAM

Magnetic tunnel junctions (MTJ) have been used for years as the "read sensors" in hard disk drives. Materion is the world's leader in shipping PVD materials for MTJs with over two decades of experience in manufacturing high purity magnetic materials for thin film deposition. That experience, along with the expertise of our dedicated materials scientists, allows us to understand the unique characteristics of storage devices and help our customers develop new materials for next generation technology. We understand the unique characteristics of storage devices and help our customers develop new materials for next generation technology. [Read more about emerging types of data storage...](#)



**Wishing you all  
the best!**

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