



Coating Materials News

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Inorganic Chemicals & Specialty Thin Film Coating Materials

Improving Production Efficiency & Yield of Optical Coatings

Challenges Related to Volume Production

There are a number of challenges associated with achieving high yield in the coating of many small or large substrates. These include making the most efficient use of both materials and the substrate area, which often has a non-flat surface, as well as considering the amount of time spent in coating production. In addition to these challenges, there are three major issues related to the volume production of thin film optical coatings. Following, we discuss the problems in detail and describe current technological solutions.



The Key Issues

The following factors have been found to limit efficient and consistent production of optical coatings:

- * Source material preparation time
- * Material usage and consistency over time
- * Efficient coating thickness distribution

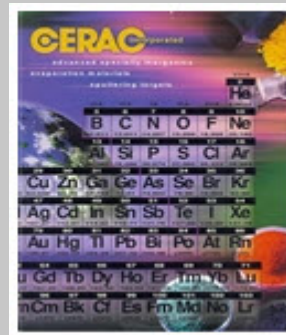
Coating System Considerations

Complete, self-sufficient coating systems that provide programmable controlled deposition of the individual layer thickness for complex coating designs are manufactured by several firms. However, not everyone adequately addresses all three of the issues previously mentioned. For example, the traditional method for preparing high-evaporation temperature oxide compounds such as Titania, Tantalum, Hafnia, Zirconia, and Alumina is to load an evaporation vessel (e-gun crucible or resistance-heated container) with pieces or tablets of the source material. Then the evaporation technician proceeds to exercise repeated melting/venting cycles to attempt to prepare a dense mass of starting material. After the first deposition cycle, fresh material is added to the used charge and another melting/venting cycle is required before production can resume. This procedure is time and resource-consuming, and does not produce a consistently homogeneous starting charge.

Source Material and Preparation Time

A solution to this source preparation and conditioning problem has been available for a few years in the form of pre-melted forms made by Materion (CMN: Vol 15 no. 1

[Materion Inorganic Chemicals Catalog](#)



Additional 13 inorganic chemical materials including [thorium nitrate](#), [titanium phosphide](#), [lanthanum titanate](#), et. al.



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Face to Face
around Materion

(2005); V14 no. 2 (2004). The forms are created by thoroughly melting large quantities of the material at closely controlled temperatures and pressures. Table 1 lists evaporation-ready charges of the most frequently used and preparation-intensive materials that succeed in reducing the labor and vacuum resources required for coating production. Process-ready cone forms of specific oxide compounds that are most frequently used between UV and IR, including high laser damage threshold (LDT) applications. To read the complete technical paper, click on [Improving Production Efficiency...](#)

Pre-Melted Evaporation Materials

Optimizing Thin Film Layers

It has been demonstrated that pre-melted materials reduce process start-up time and improve equipment utilization. Materion offers a full turnkey solution to manufacturing a broad range of pre-melted products in standard size cones and discs as well as forms designed to customer specifications. Because we tightly control the materials and the manufacturing process, we are able to achieve consistently high quality and purity.

Our high vacuum process reduces typical contaminants that occur in conventional factory cone preparation. This allows us to produce large volumes of pre-melted cones because no vacuum break is required. We work with our customers on R&D efforts and can create cones, rods and other shapes from custom raw materials in various dimensions from 10cc and up.



Advantages of Materion Pre-Melted Materials

With over twenty years of experience, we manufacture consistent reliable [pre-melted evaporants](#) that offer such benefits as:

- * Highest purity material lowers spitting and raises yields
- * Optimized material lifetime maximizes deposition stability
- * Customized materials and sizes
- * Increased material density allows longer coating runs, reduces process downtime and improves melt pool stability

We also offer unique reclaim services for spent cones that amount to a cost reduction, essentially providing a one-stop shop for materials at all stages. Our pre-melted evaporation materials fit most electron beam evaporation equipment or can be specifically sized as needed. For more information, please contact Andrew Cohen, Product Marketing Manager, Andrew.Cohen@Materion.com. [View this story...](#)

Materion Advanced Chemicals...

Evolving through technical innovation.



David Sanchez

Advanced Chemicals introduces David Sanchez, Senior Materials & Applications Scientist, who has worked for Materion (formerly CERAC/Williams) for over twelve years.

During that time, he has developed specialty optics devices/materials, inorganic chemicals and markets for the advancement of vacuum coating.

David currently reports to Bart Ott, VP AC Business Development, in the Milwaukee facility and travels to sites as needed to support key projects, facilitate and qualify products, collaborate with sales, and assist with R&D.

He also continues to support coating materials and applications for UV, VIS and IR, including recent work specializing in remote phosphors and advanced display technology. While David's titles have changed over the years, he is proud of his global role at Materion "in bringing customer's challenges to the table and to work on technological solutions for thin film applications and technical materials." Read more about [David Sanchez...](#)

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