



Coating Material News



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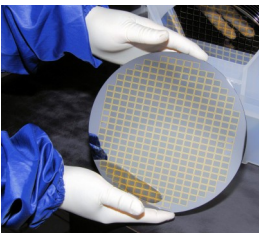
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Oxides and Nitrides of Aluminum

This article will compare the properties, applications and deposition processes of films of the Oxygen and Nitrogen compounds of Aluminum; specifically Aluminum Nitride, AlN, and Aluminum Oxide, Al₂O₃ or Alumina. Although they are neighbors on the periodic table of elements, oxide and nitride compounds of various metals exhibit different physical properties and therefore are used to satisfy different applications. While Alumina is found naturally as the material Corundum, AlN does not occur naturally but must be artificially grown.

Comparison of Properties

The common oxide compounds of Aluminum, Tantalum, Silica, Titania and Alumina are transparent between near-UV and Mid-IR wavelengths, with Alumina transmission reaching ~250 nm. For that reason, these compounds are often used in thin-film optical coatings. Alumina optical films provide some degree of protection against abrasive wear and chemical reaction. However, they are never as hard as crystalline sapphire, because the density and morphology of the films are not of the same form.



The common nitride compounds of Aluminum Nitride (AlN) and Silicon Nitride (SiN) are transparent at wavelengths longer than mid-visible wavelengths and produce hard coating layers. Compounds of transition metals to form Titanium Nitride (TiN), Chromium Nitride (CrN) and others are not transparent, but find application as tribological and wear resistant coatings such as on tools, decorative surfaces, and high-temperature applications.

Applications

Aluminum Oxide films are used in optical coatings several ways: as an intermediate index material, as a protective overcoat for aluminum and silver mirror films, and in thick layers as a barrier to salt, steam, and other corrosive agents. [Read More...](#)

Transparent Conductive Thin Films

With the maturation of Indium recycling and the stabilization of reactive ZnAl and dc-sputtered AZO (aluminum-doped zinc oxide), a majority of coating applications are able to enjoy solutions bound only by the size, cost and annealing required to maximize spectral properties at the proper resistivity. In this article, we will review the issues relating to coatings on polymers, the status of the oxides, and the challenges of producing conductive coatings that retain high transparency farther into the Infrared region. ([For more background](#), see our previous discussion in *Transparent Conductive Coating* that focused on ITO (Indium Tin Oxide) and AZO (Aluminum Doped Zinc Oxide).

In the not so distant past, reliance on newly mined and refined Indium, coupled with rapid expansion of the display industry, often caused the price of Indium and ITO to fluctuate wildly. Even with the recycling of Indium helping to stabilize supply and robust ITO TCOs produced by planar and cylindrical sputtering, the threat of price volatility is still of critical concern to cost-conscious users. Because Indium is a key component which is rare and expensive, finding a replacement and optimizing an innovative route - coupled with refinement - remain on the front line of development. [Read More...](#)

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Face to Face

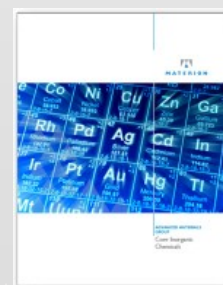
Meet our Sr. Development Chemist Brendan Liddle whose focus is on new product development for the inorganic chemicals business. His responsibilities include working closely with customers to create specific materials that allow their process or products to succeed. Brendan also supports Materion's existing products and lends his expertise to troubleshooting processes.



Based out of the Milwaukee, Wisconsin facility, Brendan joined Materion's technical team in February 2011 and reports to Katie Gardinier, AMG Director of Technology. As part of his job, he travels occasionally to visit with customers or to attend a trade show or conference.

When asked 'what part of your job do you find most satisfying,' Brendan remarked: "I really enjoy the variety at Materion. I especially like working with the diverse range of products we produce for such a broad spectrum of advanced technologies."

[Read more about Brendan...](#)



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