

# Coating Materials News

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*Inorganic Chemicals & Thin Film Coating Materials*

## Materials & Deposition Technology for Coating Optical Surfaces - Technical Paper



### Understanding the Components of the Process

The materials and deposition processes employed to make coatings that are intended for use at wavelength regions between UV and far IR are described in this overview of the technology. Coatings

composed of special materials are deposited as nano- and micro-meter thicknesses by specific techniques to control the optical, mechanical, chemical and electrical properties of optical surfaces.

### Design & Engineering Considerations for Coating Optical Components

The components of the deposition process, starting with the performance specifications and continuing through the finished coated surface, are diagrammed in Figure 1. It is evident from the number and descriptions of the process components that material science and deposition technology play complex interdependent roles in the overall process of producing optical coatings.

It is important for the system designer to understand the individual components of the process and their interactions. When presented with the spectral and environmental requirements and the substrate material to be coated, the coating engineer has the responsibility of selecting the appropriate coating materials and deposition process. A thin-film design is then generated that includes the wavelength dependencies of the optical constants, refractive index and extinction coefficient - quantities that need to be pre-determined for specific materials and their deposition process parameters. From this theoretical layer-by-layer design, the performance is predicted and evaluated with respect to spectral coverage, incidence angle, surface shape, substrate temperature constraints, mechanical durability and verification measurement.

[Read the full paper on Materials & Deposition Technology for Coating Optical Surfaces...](#)

## Coating Materials & Technology for Long Range IR

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**Face-to-Face  
Around Materion**

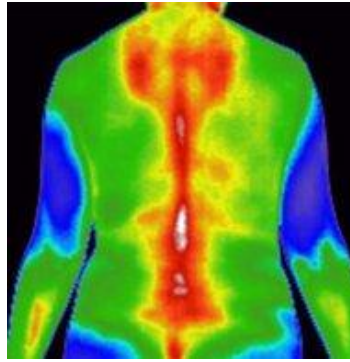


Edward Strother, VP of Marketing for the Advanced Materials business, has been a key player at Materion and its predecessor CERAC for over 20 years. He currently oversees technologies and resources including R&D, strategic planning, marketing and marketing communications. Known to his co-workers as "EJ," he reports directly to President Don Klimkowicz.

## Coatings

### Growth in Applications

There are new developments in infrared (IR) materials and an ever growing number of applications for IR coatings. As a leading supplier, Materion specifically prepares and refines infrared (IR) coating materials to meet these increasing demands. Following is a review of the materials, technology and some of the applications that require IR coatings.



### Applications of IR

The majority of IR applications operate at mid-wave and long-wave spectral regions where thermal energy exceeds the visible solar energy background (See Figure 1). The instruments and sensors for these regions detect emitted rather than reflected energy. There is a growing list of applications for IR instruments which is expected to expand as more and different IR sensors are developed and brought to market. Materials that are used in making thin-film coatings for these applications are also under continuous development. Among the applications are:

- Military and commercial intrusion detection for security: detection of heat sources such as vehicles and personnel under nighttime and camouflaged conditions.
- Invisible communications, night or daytime.
- Fire and rescue searching under smoke and nighttime restrictions.
- Biomedical thermography: detecting and monitoring tumor and circulation problems. Non-invasive and radiation-less imaging of breast cancer and circulatory blockage.
- Industrial and commercial: process temperature monitoring and the detection of heat loss points from buildings.
- Climate monitoring: determining distribution and concentration of atmospheric gases including water vapor, and ocean and land temperature mapping via satellite.
- Remote mineralogy: composition of planetary surfaces.
- Automobile night vision: detection and avoidance systems.

### Basics of IR Technology

The spectral regions of infrared energy that reach the surface of the earth are chopped up by water and carbon dioxide absorption bands in the atmosphere, leaving specific windows through which terrestrial IR instruments can operate (Figure 1). The full solar emission spectrum is only available in the extraterrestrial space environment. [Read more about Coating Materials & Technology for Long Range IR Coatings...](#)

When asked about his experience at Materion, EJ responded enthusiastically: "Meeting a wide spectrum of people in varied worldwide markets - from fellow employees to customers to vendors - makes working here a genuine pleasure. It offers the greatest opportunity to contribute to the success of the company while broadening my own horizons."

EJ currently resides in Wisconsin but manages Marketing & Technology for Materion's Advanced Materials Group facilities in Buffalo, NY, Wheatfield, NY, Brewster, NY, Albuquerque, NM, Suzhou, China, Singapore and his native Milwaukee. His responsibilities include a broad range of products and services, including inorganic chemicals, precious and non-precious thin film deposition materials, precision parts cleaning and precious metal reclamation. In addition, he works with other business divisions within Materion to maximize growth through a coherent strategy of shared expertise and resources.

From his early laboratory training with materials and chemicals, EJ migrated to the business side, initially developing new products and quoting estimates. [Read more about EJ...](#)

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