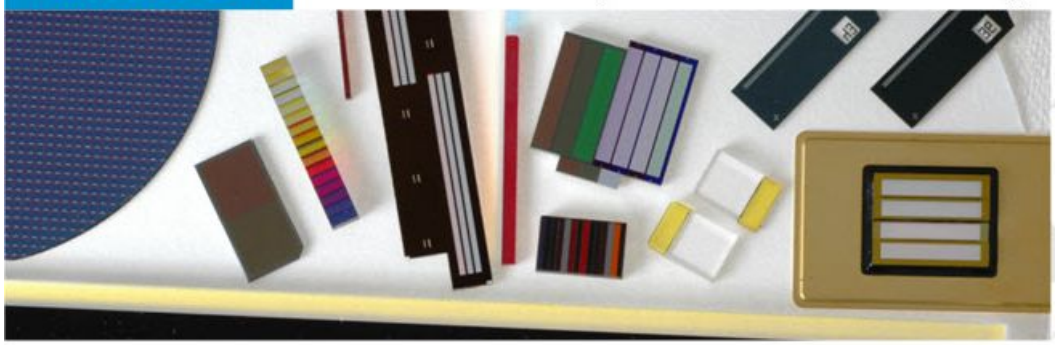
MATERION Barr Precision Optics & Thin Film Coatings



Optical Innovations News Volume 2, Issue 2

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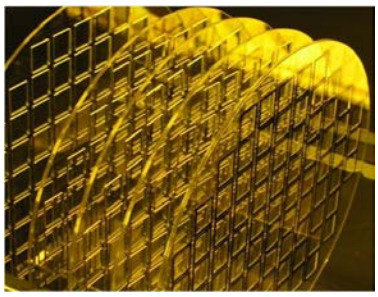
Detector Level Optical Coatings

Unique Solutions for CMOS Filtering



The use of CMOS (Complementary Metal-Oxide Semiconductor) image sensing technology has grown considerably over the last several years. According to a market report by Yole Development, the CMOS image sensing market will reach $8.7B in 2014 and 3.5B sensors will be manufactured. Much the volume growth can be attributed to its use in mobile and tablet applications. Beyond mobile, the versatility and functionality of CMOS technology is finding its way into many other applications such as gesture control and 3D imaging, smart TV, wearable devices and automotive controls.

This growth has been enabled by improvements in CMOS technology and a decrease in manufacturing costs. This makes it affordable in some applications, such as mobile, to use multiple sensors in one device. One particular innovation has had a significant impact on cost, as well as on overall package size; that is, the shift from discretely packaged sensors to wafer level packaging. Using this technology, a "window" wafer is bonded directly to the wafer containing the CMOS devices and then diced to create a batch of finished sensors.

Optical Filtering Plays Key Role

Filtering plays an important role in CMOS imaging and sensing. More complicated spectral filtering and blocking can be achieved in several ways. Materion has developed an exciting new capability to deposit the spectral filter directly onto the device. To read more about spectral filtering...

In This Issue

Contact Us
www.materion.com

Meet Materion: Jason Ridley

Meet Jason Ridley, Staff Engineer at Materion Barr Precision Optics in Westford, MA who reports to Andrew Houde, Director of Engineered Films Business. During his three years with the company, Jason has

Optical Filters for Gesture Control & 3D Imaging Applications

Materion at Forefront of Evolving Technology

In the last few years, the gaming industry has introduced the world to the concept of gesture control. This technology will continue to proliferate beyond gaming and into products that we interact with in everyday life. These applications include mobile devices, home theater and other consumer electronics and likely, automobiles. Beyond merely controlling our devices with hand motions, the core technology behind gesture control will open up the world of 3D Imaging.

A critical component embedded in this technology and a major enabler is the optical filter. To support the unique type of filter that this industry requires, Materion has developed a process to manufacture a narrow band filter with low angular shift across the 800nm-900nm wavelength range, high transmission, good band shape, and high signal-to-noise ratio.

Innovative Filters Meet Customer Needs

A typical narrow band filter at these wavelengths can be complex to design and manufacture. This becomes even more challenging when they need to be manufactured in extremely high volumes, like those associated with consumer electronics applications. Materion is one of very few optical filter manufacturers in the world with the expertise and the infrastructure to design and manufacture this type of filter in volume - and do it cost effectively. Read more about transmission in narrow band filters...

Critical Attributes - Narrow Band Interference Filters

Material Selection Impacts Performance

The concept of a narrow band pass filter is simple. These are devices that let a specific range of wavelengths pass, while rejecting others. This article will present the salient aspects of a typical narrow band filter.

Characteristics of NBP Filters

The Peak Transmission is the highest level obtained in the pass band; Ripple is the variation in transmission in the pass band. The shape of the filter can be specified in many ways, the simplest is to specify the full width at one half of the peak transmission (Full Width at Half Maximum, FWHM). Other widths, such as the 90%

provided invaluable front-to-back end engineering support for Engineered Films and High Value Coatings product lines.

Jason enjoys the challenges he faces every day at work. As he sees it, "a boring day at the office means that I learned very little!" He is impressed that "Materion is committed to being a major global player in rapidly evolving technological markets."

With his past experience in ionic self-assembly of inorganic nano-particles and polymeric materials for optical, electronic, and biomedical applications, Jason brings critical experience to Materion. He also holds a Doctorate of Philosophy in Physics from Virginia Polytechnic Institute and State University. Read more about Jason...

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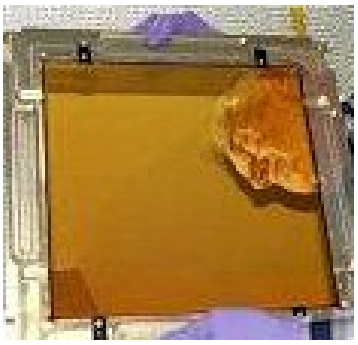
and 10%, serve to further constrain the performance. The rejection band is the region in which most of the incident light is not transmitted. It can either be reflected or absorbed, and for filters that have wide rejection bands, both.

In this article, the filter is a 3 cavity Fabry-Perot filter. A Fabry-Perot filter consists of a dielectric reflecting stack, a spacer layer and a second matched reflector. If these structures are combined in series, they produce spectral characteristics with steeper slopes and greater rejection while maintaining the FWHM. Read the complete technical article on NBP filters...

Narrow Bandpass Filters

Large Format Filters for Telescopes

In 2011, Materion began work on a coating chamber that could handle large bandpass (BP) filters for newly developed telescopes and instruments. Filters are used to select specific wavelength bands of interest while rejecting unwanted starlight and are critical elements. Filter development projects were planned around the impending construction of these new systems that included Subaru HSC, LSST, DECam and others, most of which called for large wide BP filters.



A large H-alpha NBP for Skymapper (Photo: Courtesy Australian National University)

Materion Large Optics Facility: Officially came online in mid-2013 and is now fully operational. Large astronomy instruments, which up to now have employed mostly or only wide bandpass (WBP) filters are now able to utilize narrow bandpass (NBP) filters. There has always been a desire to select a very narrow chunk of the spectrum in order to enhance the science return; this was easily accomplished because the size was small. However, as instrumentation increased in size over the past 10-15 years, this posed a new problem: narrow filters could not be made in sizes large enough to satisfy the astronomers' needs.

The situation is resolved as Materion can now produce narrow filters in large sizes. In fact, there is significant activity in this upgrade arena. Since wide filters are still needed for some applications, we continue to make both wide and narrow filters in very large sizes. Read more on testing results with narrow filters...

See you there!

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