

New Product Spotlight

Sensity Dark and Shine – Expanding Opportunity in the Photochromic Market ABO Technical Level II

By Deborah Kotob, ABOM

Objectives

1. Learn the market challenges and opportunities for new improved light reactive lens technology
2. Learn about the new light reactive lens technology with a mirror coating. Sensity Shine and its youth and fashion market appeal.
3. Learn how to position new photochromic technology advancements in your lens offerings

Course Description

In this course, you will learn how new light reactive *aka* photochromic lens technology is expanding the appeal of photochromic lenses to new generations. You will learn about new photochromic technology that's more responsive behind the car windshield, and you'll learn about new fashion photochromic lenses with mirror coatings.

Photochromic technology is impressive in its own right, but now we have something new to get excited about in the photochromic category; the Sensity Shine light reactive lens with a mirror coating! The innovative fashion aspect of this newly expanded offering allows us to reach the broader youth and fashion demographic. On the other hand, Sensity Dark appeals to the eyeglass wearer who seeks functional, practical and convenient features in the eyeglasses. The improved performance of both activation and fade back speeds in Sensity Dark non-mirrored choices removes the main objections to photochromic lenses as the customer's primary pair of eyewear by being darker and clearer faster. The photochromic lens category is primed for expansion, and this course will address ways to ride the light reactive lens wave!

This is a print course accompanied by a 20/20 interactive e-learning video. We want your learning experience to be fun and memorable. After reading this course, you will enjoy watching and interacting with a video summary where you can play games to check your comprehension and memory before taking the 20 question exam to earn one technical level II ABO credit.

This new product, spotlight course is supported by an educational grant from HOYA Vision.

Market Challenges and Opportunities

The photochromic lens category is important since it is the only lens type that adapts to indoor and outdoor luminance levels in the same pair of glasses. Now a new category of photochromic lenses has emerged the photochromic mirrored fashion sunglass lens, Sensity Shine. This new category of photochromic sun lens is perfect when fashion is the motivating factor influencing the purchase decision. But, let's focus on the **magic** that is photochromic. We are wowed by technology that magically responds to light and improves our lives by providing visual comfort, light protection, and convenience. Our 'tech crush' is evidenced by the number of electronic gadgets that permeate our lives. You can visibly demonstrate this technology for your customer and create a hi-tech experience that resonates. We live in a time when we expect functional items to be made better through technology. Lenses that automatically darken outdoors and return to clear indoors are an example of eyeglasses, a functional product, made better through technology. And, now fashion sun lenses are made better with the magic of photochromic technology. This equates to a great opportunity to provide exceptional eyewear solutions for your customers.

Advancements in light reactive lens technology matter only if they increase consumer satisfaction. To that end, we must understand what consumers want from photochromic lenses. First, they want the lens to darken quickly outdoors and to return to a clear state quickly indoors. And finally, they want the lens to darken to a sunglass level but want it to return to a clear lens with no discernable tint when indoors. They would love it if photochromic lenses had some tint behind the windshield of a car. They require and assume that full UV protection is present in their photochromic lenses.

Note: We must overcome our own photochromic lens bias which is founded based on the performance of old photochromic technology and outdated information. Only by knowing the advancements in light reactive lens technology can we fairly represent this exciting lens category with the enthusiasm it deserves!

We will step through the features of this new light reactive lens technology from HOYA, and we'll see how it improves photochromic lens performance and addresses the above photochromic customer 'wish-list.'

Next generation photochromic technology:

Three development targets.

1. Improve **photochromic performance** using a technology that enhances the photochromic dye chemical reaction in all temperatures
2. Improve lens color and expand **color** choices in tint add photochromic lenses with mirrors to the offerings.
3. Improve lens **durability**

Photochromic performance:

HOYA's **Stabilight Technology** ensures consistent photochromic performance in varying climates and temperatures.

Faster fade back:

With Stabilight Technology the lenses fully deactivate to a full clear state in less than 5 minutes.

Fast to darken:

With Stabilight lenses darken to full density in about 30 seconds.

Photochromic performance and temperature sensitivity:

Stabilight Technology improves the consistency and stability of the lens photochromic performance in all environmental conditions because it's less UV and temperature sensitive. Why is this important? Old photochromic lens technology was highly temperature sensitive. In cold temperatures, the lenses darken too much and are too slow to return to clear. In hot temperatures old photochromic technology doesn't darken enough. With Stabilight Technology there is less sensitivity to temperature.

Stabilight Technology manages light and temperature reactivity for consistent photochromic performance; quickly darkening to a category 3 sun lens tint outdoors and with a faster fade back speed to a clear lens indoors. Sensity photochromic lenses provide 100% UV protection and a high level of blue light filtration in the activated state.

Color improvements:



Sensity photochromic lenses now feature **three deep, natural tints** developed by color specialists to complement sun lens trends: Silver Gray, Bronze Brown and Emerald Green. The colors provide excellent

contrast and discomfort glare reduction. Sensity Dark silver gray or bronze brown or emerald green provide saturation of up to 35% deeper color tone, so the lenses darken to a category 3 sunlens. Category 3 sunlenses have between 8% and 18% transmission, useful in very bright outdoor conditions to reduce discomfort glare.



Shine Emerald Green



Shine Bronze Brown



Shine Silver Gray

For the **Sensity Shine** light reactive lenses, each tint shade has a specific **color mirror**. The Silver Gray tint has a light silver mirror for added comfort in intense light conditions. The Bronze Brown tint has a copper mirror for greater contrast that sharpens vision. And, the Emerald Green tint has a blue mirror for increased HEV blue light protection.

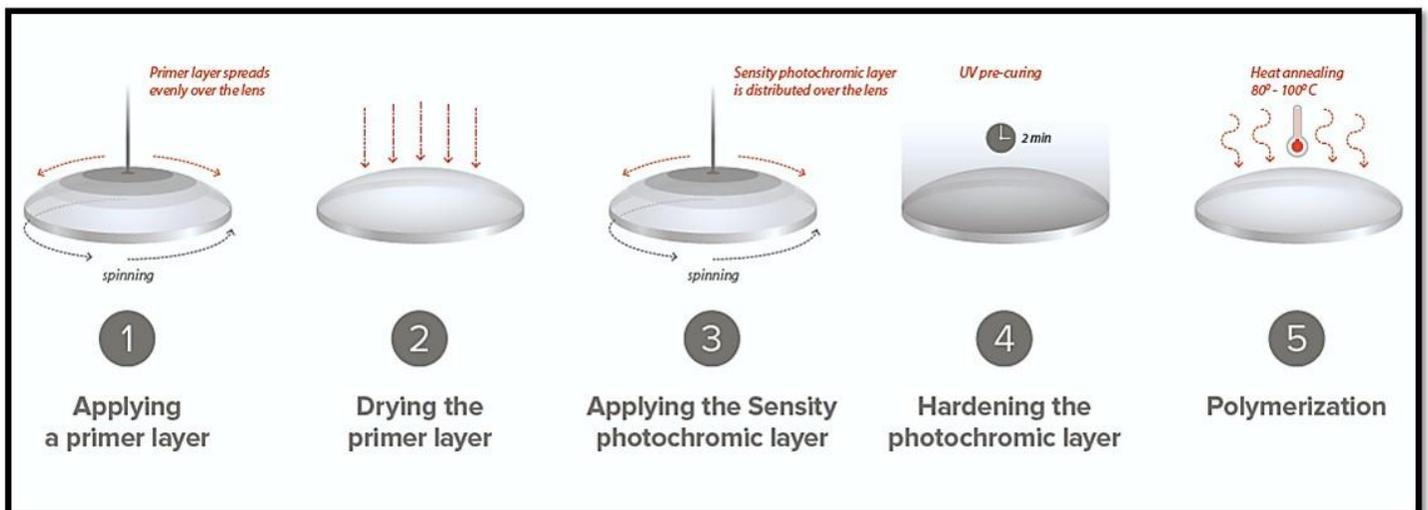
Improved durability

All Sensity light reactive lenses are made with HOYA's proprietary **Photochromic Precision Technology (PPT)**. A microscopically precise spin coating process that ensures the even distribution of photochromic dye molecules over the entire lens surface. The even distribution and advanced adhesive properties extend durability, improve the photochromic performance and lifespan. All of the Sensity light reactive lenses are compatible with HOYA premium coatings.

With Photochromic Precision Technology, the Sensity photochromic layer is applied using a spin coat process that allows the precise application of microscopically thin layers. Photochromic Precision Technology results in superior adhesion and durability of the AR layer to the lens.

On the lens' back surface the hard coat, AR stack and the oil and water repellent top layer are index-matched to the front surface properties to improve substrate compatibility for a long-lasting bond.

Let's look at the application process of the spin-coated photochromic layer in more detail.



1. A lens primer layer is applied to the lens surfaces. This layer is an adhesion layer that bonds both to the lens surfaces (front and back) and bonds to the next layer applied.
2. The primer layer is dried. Again, spin coating ensures uniformity of the coating thinness across the entire lens surface.
3. The photochromic layer is applied using the precision of this spin coating process.
4. The photochromic layer is pre-cured using UV to start polymerization and harden the photochromic layer.
5. In step 5 the photochromic hard coat goes through a final cure in an annealing oven at 80-100° C to fully harden and complete the coating polymerization and molecular bonding of the primer.

This spin technology is currently applied to any continuous front surface lens blank, i.e., free-form progressives, office-type and of course, single vision lenses are possible. Stock and finished SV lenses are also an option thanks to the spin coat technology.

Sensity Dark and Sensity Shine are the next generation photochromic technology in the Sensity family of light reactive products. The technology represents an exciting evolution for Sensity: achieving greater darkness outdoors in all temperatures. And, they even maintain a level of tint behind the car windshield because they react to a broader light spectrum. The density of the tint depends on the intensity of the light reaching the lens.

The photochromic dye sensitivity to visible light is dependent on **the intensity of light** that reaches the lens. Manage your customer's expectations and explain that the lens moderately reacts behind the car windshield depending on the intensity of the light coming through the windshield.

About HOYA's proprietary photochromic technology:

Sensity Dark darkens even in hot temperatures, overcoming one of the main objections to old photochromic technology. Another impressive feature: the lenses fade back to full clarity indoors. Sensity Dark lenses are extra dark outside and even darken some inside the car. How is this possible? Instead of relying solely on UV activated photochromic dye molecules this new dye formula is also reactive to select high energy wavelengths in the visible spectrum. Although most UV is blocked by the windshield, the visible light rays pass through the windshield and reach the lens. At 410nm there is a 25% difference in darkening (reduced light transmission) thanks to photochromic dye activation by visible light. Sensity Dark remains at a higher level of activation vs. standard photochromic technology that rapidly deactivates in the absence of UV rays.

Sensity Dark lenses are darker providing more comfort in bright light conditions. The tint (Silver gray, Emerald Green and Bronze Brown) is uniformly distributed throughout the lens for all stages of activation. This uniform distribution of the tint throughout the lens and color density are made better with Sensity technology.

Sensity Shine is a new evolution in a photochromic sun lens with youth and fashion market appeal! Shine adds style to photochromic lenses, appealing to the fashion conscious and trendsetters alike. They'll love the style of the mirrored sun lens outdoors while appreciating the technical aspects of photochromic lenses. The mirror coating has the combined benefit of adding style to a sun lens that adjust to different lighting conditions and that provides added protection from harmful UV and blue light through surface reflection. The Shine lens mirror coating is distinct when the lens is in the darkened activated state. It becomes subtle when indoors against a clear lens. The fashion and function of the mirror coating combined with excellent photochromic technology is the reason that Shine embodies the evolution of the sun lens. Sensity Shine mirror reduce the transmission of light through the lens when outdoors by reflecting visible light rays off of the surface of the lens — thus providing comfort and style. Sensity balances light management with a combination of light reflection due to the mirror coat that lower light transmission and UV and Visible light activation of the photochemical dye molecules. Note: The mirror coating reduces the amount of UV reaching the dye molecules; therefore the shade of tint is less, but it is balanced by the lower transmission due to reflection.

- Silver Gray lenses have a silver mirror making it the best for intense light environments.
- Emerald Green lenses have a blue mirror for greater blue light protection
- Bronze Brown lenses have a copper mirror for greater contrast.

How to Position New Photochromic Tech in your Lens Offerings

Understand the reasons that patients wear photochromic lenses and understand the new opportunities afforded by new next-generation light reactive lens technology.

In a HOYA commissioned a study, completed by Millard Brown, a company that works with 90% of the world's leading brands to help define the brand purpose and engage consumers, they found these answers to the question, "Why do you wear a photochromic lens?"

Half of the respondents cited sunlight sensitivity; glare reduction, and UV protection while in one pair of glasses. This shows that protection from the sun and convenience drives a photochromic purchase. Glare sensitivity increases in the presence of certain ocular conditions like cataracts and due to age-related physiological changes to the eye.

The convenience of photochromic lenses to protect the eye from discomfort glare is a beautiful feature. But, this doesn't mean that a pair of quality-polarized sunglasses won't better serve the patient when driving by protecting the eye from dangerous, blinding disabling glare. It is the perfect solution for their general purpose pair of eyewear since it works indoors and outdoors. And, even for the multi-pair customer, their photochromic general purpose pair serves them because we all forget our sunglasses at times. Or we are making frequent stops and don't want to switch glasses continually.

The best way to understand the actual effect of these lenses is to wear them yourself so that your experience is first hand and delivers the best, personal and credible recommendation. Lens color is also vital for performance, both the view through the lenses and their cosmetic appeal. It is the color (hue) and its density (darkness) that results in glare and sun sensitivity reduction. This new photochromic technology maintains consistent color and darkness throughout the lens substrate in all phases of activation.

What do consumers, our customers want from a photochromic lens? In a word, high-speed photochromic performance. They want the lenses to activate to a sunglass level tint quickly outdoors, and they want the lens to fade back to clear fast indoors.

Teach patients that photochromic lenses provide 100% UV protective regardless of the degree of tint. Remember UV protection is the result of invisible dyes dispersed throughout the lens during the curing process and has nothing to do with the level of tint. (UVB is defined as radiation from 280 to 315nm and UVA from 315 to 380nm according to ANSI and ISO standards)

In addition, there is some absorption of the blue wavelengths. In the faded state blue light is reduced by about seven percent while in the darkened state 80 to 88% of this harmful radiation is absorbed.

Help your customer understand that the hazard of blue light is damage to the retina which is thought to accumulate over a lifetime. Therefore decreasing the level of lifetime exposure to blue light is sensible. An important feature of sunglass lenses is having added protection from blue light because our greatest exposure to blue light by far is from sunlight. Digital devices also emit blue light but in at greatly reduced levels from the sun. That said blue light from screens might contribute to eyestrain. Therefore reducing blue light emissions from screens will potentially reduce blue light-induced digital eyestrain.

Ride the new photochromic wave that is opening up new ophthalmic and sunglass lens markets. Demonstrate the magic of the advancements in this lens technology. Wear it and recommend it with confidence, after all, who doesn't want the added comfort, protection and convenience in their primary pair of eyeglasses? Open up a new photochromic market with Sensity fun fashion-mirror light reactive lenses!

Congratulations on completing this product spotlight course on new HOYA Sensity, Dark and Shine, Light Reactive Lenses.

For one-hour Technical Level 2 ABO credit take the exam at 2020mag.com\CE.