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NEO**CHROMES**®

Embrace the light

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HIGH QUALITY →
LIGHT SENSITIVE LENSES
CHANGE/ ↔ WITH → YOU

HIGH QUALITY →
LIGHT SENSITIVE LENSES
CHANGE/ ↔ WITH → YOU

As part of **IOT's commitment to innovation for high value-added products, we offer Neochromes® light sensitive lenses.** This line of the highest quality lens blanks offers excellent performance, allowing IOT partners to differentiate themselves with products that consumers perceive as superior to what is currently on the market.

FEATURES →

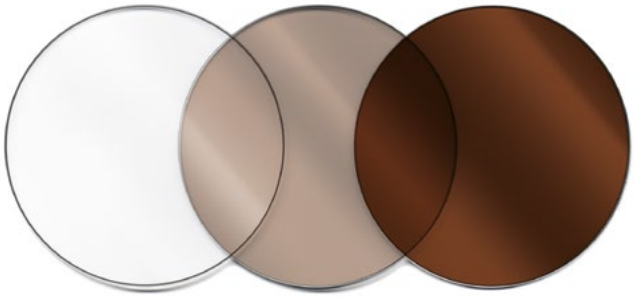
The features of Neochromes® lenses can be demonstrated by any eyecare professional and are easy for wearers to understand. They're specifically designed to provide answers to the most common questions, quickly and easily.

↗ **What they look like indoors?**
Crystal clear.

↗ **How quickly do they darken?**
In just seconds.

↗ **How long do they take to fade back indoors?**
At standard room temperature, they fade back in just a few minutes.

THEY DARKEN
IN SECONDS →



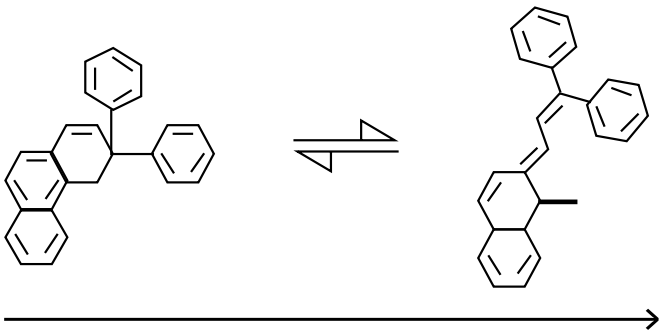
← **THEY LIGHTEN**
IN 2 MINUTES

T1/2f measured at 555 nm and 23 °C

THE KEY →
HIGH-PERFORMANCE
PHOTOCHROMIC/ ↔ DYES

Photochromic molecules have, under normal conditions, a folded shape that makes them transparent. When absorbing ultraviolet light, their shape changes, the molecular structure opens and absorbs visible light.
The two forms of the photochromic molecule - open and closed - exist in balance with a bond that's continuously broken and rebuilt.

The photochromic molecule constantly switches between its transparent and dark states.
The number of molecules during the dark state depends on the amount of UV light in the environment and other factors such as temperature. If the lens is exposed to significant levels of UV light, most of the molecules will be in the open state, darkening the lenses. In the absence of UV light, the molecules will remain closed, resulting in clear lenses.



Photochromic dye molecules change from a closed **(transparent)** shape...

... to an open, light-absorbing **(dark)** shape when exposed to UV light.

UV LIGHT BLOCKING →

UV light is generally defined as invisible, with wavelengths between 100-380 nanometers (nm). UV light has much higher energy levels than visible light. Exposure to UV light can cause changes in the skin, leading to suntan, sunburn, wrinkles, and potentially skin cancer.

The cornea and lens of the adult human eye are quite efficient at blocking UV radiation and keeping it from reaching the retina. However, UV light damages the skin and front structures of the eye. Prolonged exposure to UV light is linked to pterygium, photokeratitis (snow blindness), cataracts, and other eye disorders. Neochromes® lenses block 100% of UVA and UVB rays up to 400 nm.

BLUE LIGHT FILTERING →

Blue light is the portion of the visible light spectrum with the highest energy, usually considered to be wavelengths in the range of 400-500 nm. Sunlight is, by far, the largest source of blue light in our environment. The screens of our computers, phones, and other digital devices are also sources of blue light. Neochromes® lenses offer maximum protection against these potentially harmful wavelengths of light.

Neochromes® lenses in gray block an average of 80% of high energy light (400-420 nm) when clear, and at least 91% of high-energy light when dark. In addition, they block an average of 89% of light between 425-450 nm when dark.

PROTECTION FROM **HARMFUL UV & BLUE LIGHT** →

Neochromes® lenses help wearers care for their eyes by **blocking 100% of damaging UVA and UVB rays.** They **also filter blue light**, especially when activated outdoors. While blue light is emitted from computers, tablets, and smartphones, sunlight is a much more intense source of blue light.

Neochromes® light activated lenses
BLUE LIGHT FILTERING
Absorption (400 nm - 420 nm)

UNACTIVATED ⟶ 80%

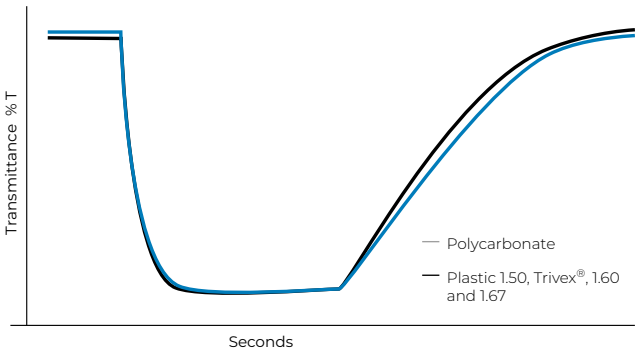
ACTIVATED ⟶ 91%

NEO**CHROMES®** / CONSISTENCY/ OF ↔ **PERFORMANCE**

MATERIALS/ ↖

In photochromic lenses, it's common to find inconsistent functionalities that vary depending on the refractive index. This is because the manufacturing processes change depending on the material. It might happen that different photochromic substances are used for lenses of different base materials

At IOT, we have taken great care to ensure homogeneous, virtually identical functionality across all materials. The visual experience with Neochromes® is consistent for any wearer, even if they choose to purchase polycarbonate lenses for their sports eyewear and lenses with a 1.67 index for every day.



TEMPERATURE/ ↖

Any photochromic lens is affected by temperature.
In cold temperatures, photochromic lenses darken more and take longer to fade back. **In warmer temperatures**, the lenses don't darken as much and fade back more quickly. This is a characteristic of the state of balance in a photochromic system. Photochromic molecules use thermal energy to return to the clear state.

In Neochromes® lenses, special attention is paid to performance at high temperatures. At high temperatures (33°C / 91°F), they will reach functional darkness that is similar to many polarized lenses (17% light transmission). At this temperature, the fade-back time is around 32 seconds.

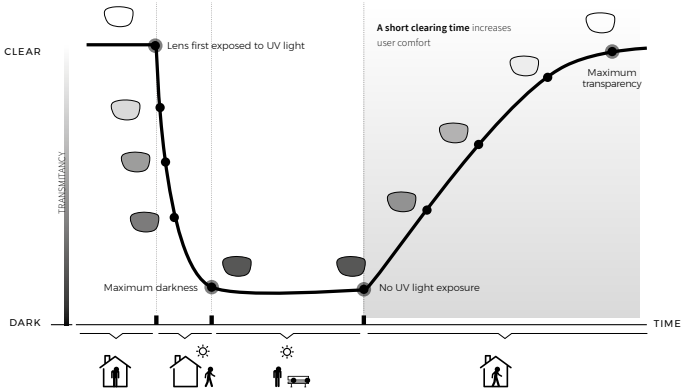
COLD CLIMATE
+ Darker
– Clearing time

WARM CLIMATE
– Darker
+ Clearing time

NEO**CHROMES®**
Embrace the light

HOW TO → ANALYZE **PHOTOCHROMIC LENSES**/ PERFORMANCE ↔

Neochromes® lenses are crystal clear indoors, darken in seconds, and fade from dark to clear in less than 3 minutes. To analyze how this contributes to a better experience for the wearer, **we study the photochromic cycle in kinetics charts.** These **show the performance of the lens as it goes from clear to dark and back again.**



KINETICS CHARTS SHOW/ **FOUR PHASES** ↔ OF PHOTOCHROMIC LENS **ACTIVATION**

1 / THE CLEAR STAGE

Before UV light exposure, the lens is in its most transparent state. The higher up on the vertical axis the curve starts (closer to 100% transmittance), the clearer the lens appears indoors.

2 / THE DARKENING STAGE

When the lens is first exposed to UV light, the photochromic molecules begin to change from clear to dark. A steep slope downward indicates fast activation.

3 / THE DARK STAGE

Lenses are at peak activation. Light transmission, activated color, and color uniformity can be assessed at this state.

4 / THE FADE-BACK STAGE

Fast fade-back is critical. It begins when UV light does not fall on the lens any longer. A steep curve upwards indicates a faster fade-back speed. The shorter the fade-back, the more comfortable and functional the lens is to the wearer.

The percentage transmission (or transmittance) is on the vertical axis. On the horizontal one, we move over time from the initial transparent state, the UV exposure, the subsequent darkening, finally, the removal of UV light and the return of the lens to the transparent state.

As seen in the kinetic graph, **at room temperature and indoors, Neochromes® lenses have a clear appearance with 85% light transmission**, similar to clear high index lenses. Light transmission is significantly increased with the application of high-quality, low reflectance anti-reflective coating.

In a photochromic lens, darkening is always much faster than lightening. The darkening speed is the time required for the lens to pass from the transparent state to its mid-transmittance point. **For Neochromes®, this value is only 6 seconds.**

The clearing speed considers the time required for the lens to pass from the activated state to the mid-transmittance point. **For Neochromes®, this time is extremely competitive: only 132 seconds.**

MATERIAL	DIAMETER	BASE CURVE
PLASTIC 1.50	76	1.25 | 2.25 | 3.25 | 4.25 | 5.25 | 6.25 | 7.25 | 8.25
TRIVEX*	75 | 70	75 MM: 2.00|4.00|5.00 70 MM: 6.00|8.00
POLYCARBONATE*	76	0.50 | 1.25 | 2.25 | 3.25 | 4.25 | 5.25 | 6.25 | 7.25 | 8.25
HI-INDEX 1.60	73	0.50 | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00
HI-INDEX 1.67	75	1.00 | 2.50 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00

* Only available in North and Latin America.
Neochromes®, optimal functionality in all materials

COLORS
GRAY
& **BROWN**

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iot
See the difference

www.neochromes.com