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ZeonorFilm® Optical Films:

For Improved Touch Sensor + OLED

Visit ZEON at Booth #811

Thin + Light … without Compromise

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1. “Glass-like” optical properties and environmental stability ……

	Unit	Condition	Glass	ZeonorFilm®	PET film	Remark
Total Transmittance	%	–	92	**91**	89	–
Special Gravity	–	–	2.5	**1.01**	1.4	Lighter
Retardation	nm	–	1	**<10**	1000<	High Quality
Water Absorbency	%	–	0	**<0.01**	0.4	High Quality
Relative Dielectronic Constant	–	1MH	3.7~10	**2.3**	3.0	

Free of “Rainbows”

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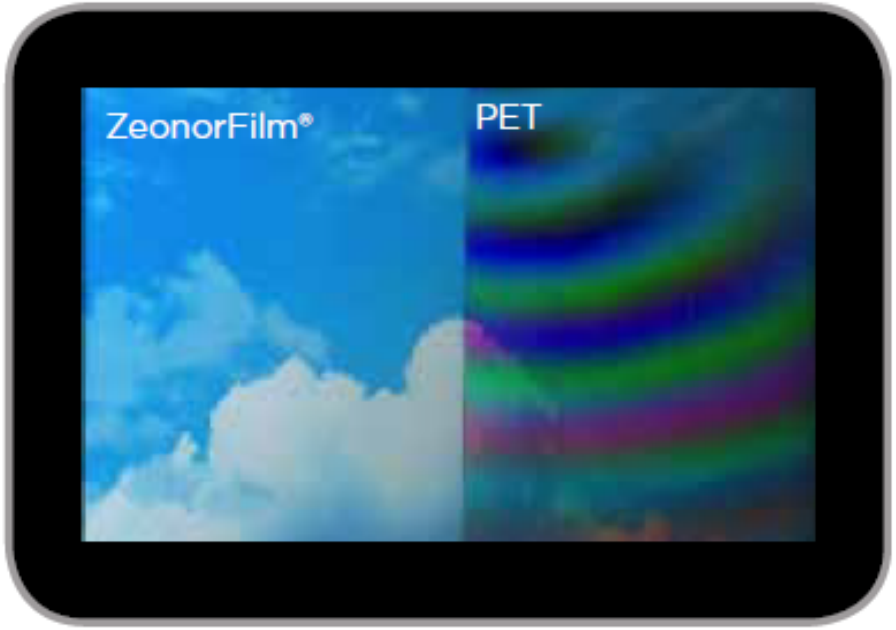
2. Less **birefringence** vs PET = distortion-free viewing, even with polarized sunglasses

View through polarized lenses



Free of “Rainbows”

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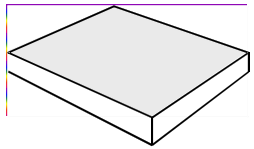
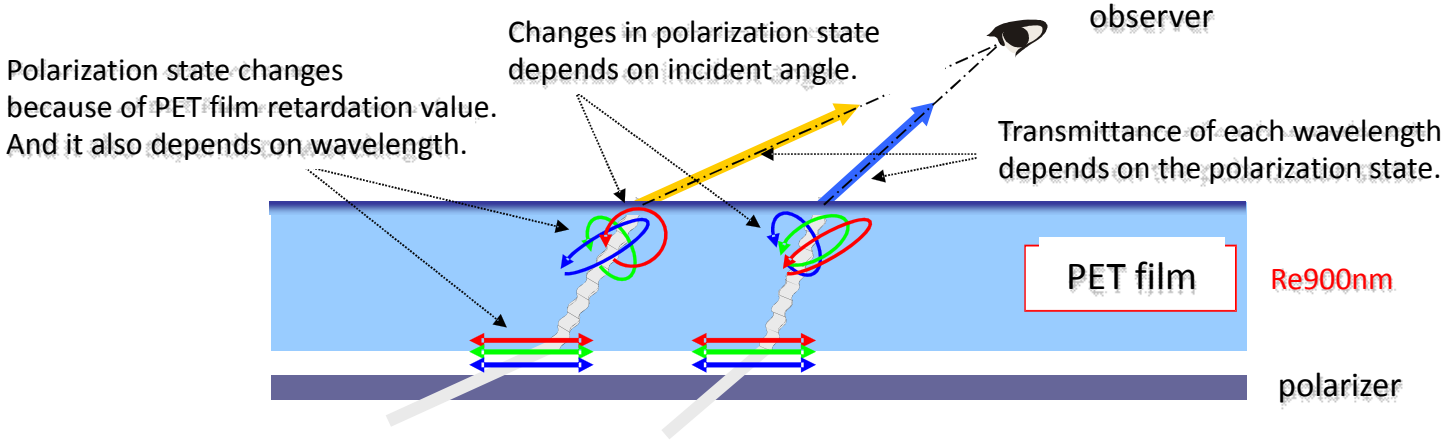
PET film suffers from **RAINBOW** appearance due to:

(1) High retardation value of PET

(2) Polarization state changes depending on wavelength

(3) Polarization state changes based on incident angle





Free of "Rainbows"

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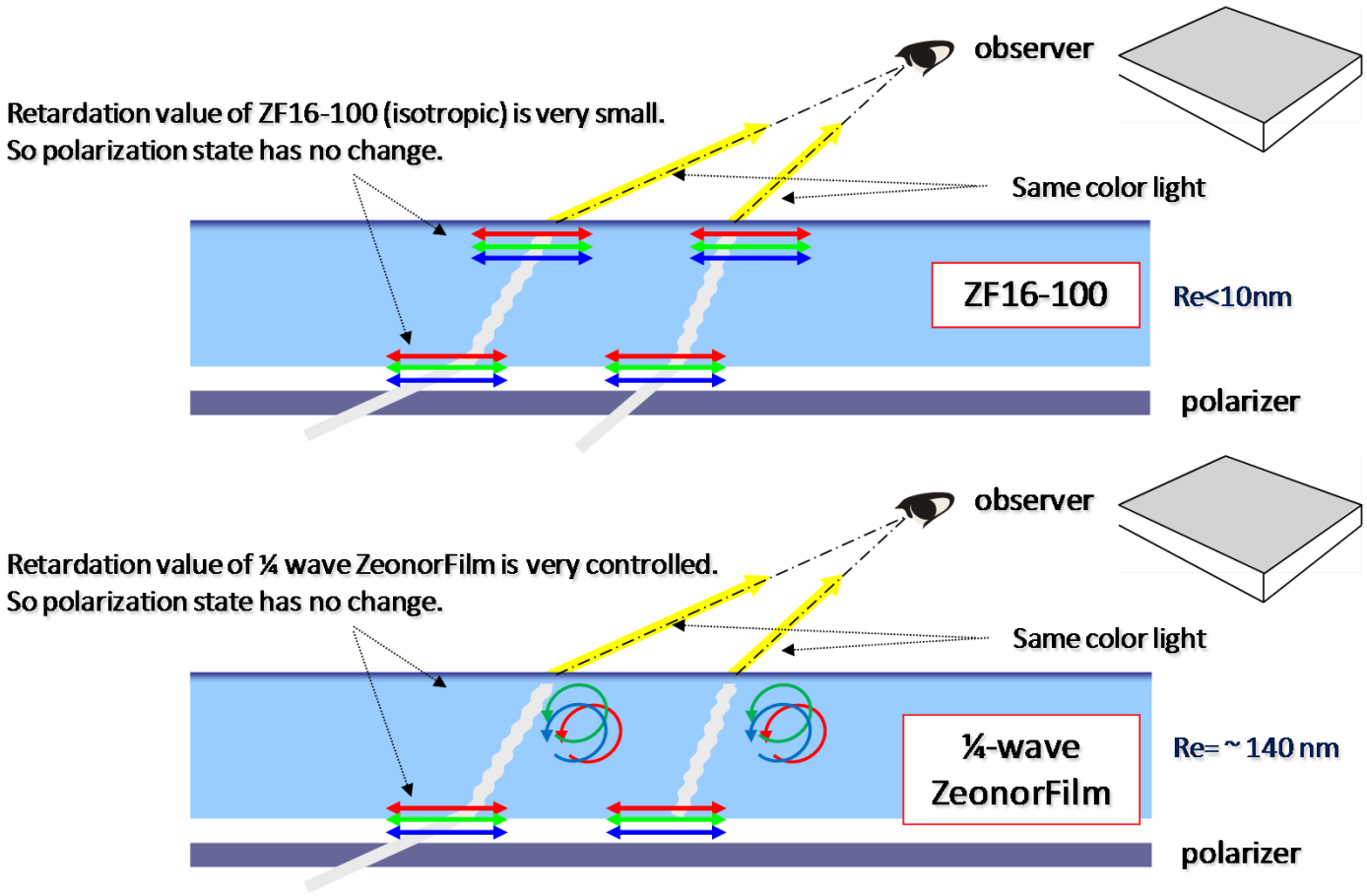
3. ZeonorFilm® has stable polarization state …. @ various viewing angles + wavelengths



Flat + Stable Birefringence

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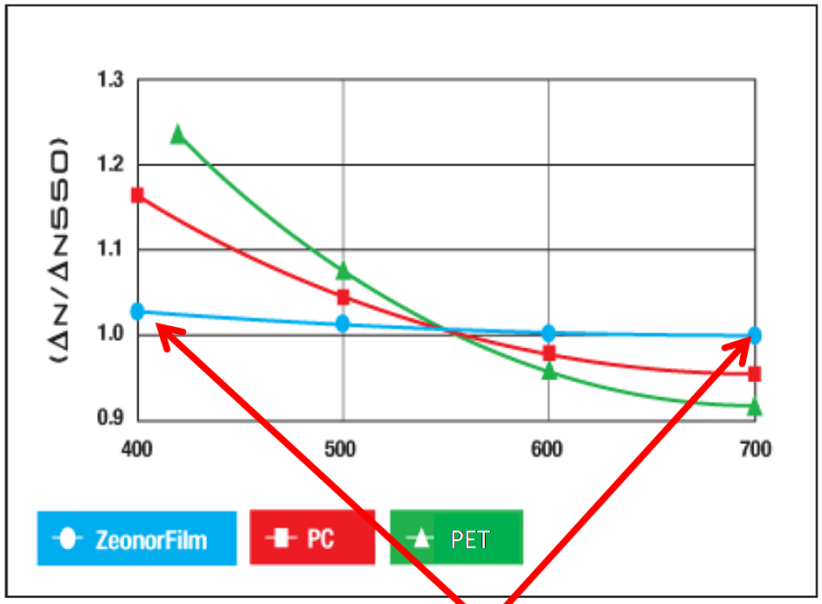
4. ZeonorFilm® has a flat wavelength distortion curve compared to PET

ZeonorFilm shows stable birefringence as function of wavelength.
* Y-axis = Re (nm) @ noted wavelength vs Re @ 550nm (nm)
* X-axis = Wavelength of light (nm)



Birefringence (retardation, n) is stable in blue + red colors

Designed for Mobile Use

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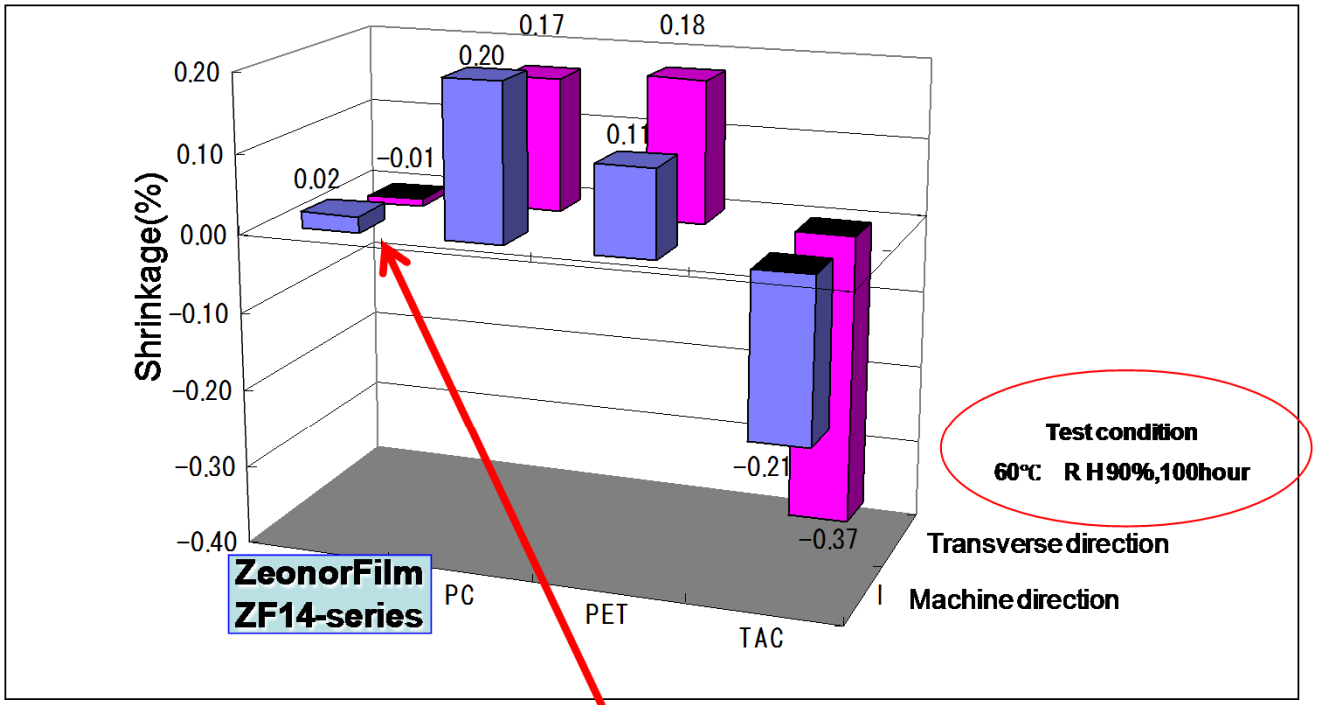
5. ZeonorFilm® shows excellent **dimensional** stability under hot, humid conditions



0.02% dimension change after 60° C, 90% RH =
Suitable for outdoor use in Hong Kong and in Arizona

Designed for Mobile Use

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6. ZeonorFilm® shows excellent **optical** stability under hot, cold + humid conditions & cycling

evaluation items: spectrum (380–780nm) and birefringence change [Re, Rth, orientation angle (θ)]

Conditions:

Test item	condition	test period
High Temp.	80deg C / dry	500hrs
High Humidity	60deg C / 90 %	500hrs
Low Temp.	-40deg C	500hrs
Heat Cycle	80deg C (30mins) ⇔ -40deg C (30mins)	300cycles

Excellent optical stability after heat, humidity, cold exposure.

Results:

Test item	spectrum	ΔRe	ΔRth	Δθ
High Temp.	no change	-0.6 ~ -0.2	-0.8 ~ +0.0	-1.5 ~ +3.0
High Humidity	no change	-0.3 ~ -0.0	-0.5 ~ +0.3	-1.5 ~ +1.5
Low Temp.	no change	-0.1 ~ +0.0	-0.4 ~ +0.3	-0.5 ~ +0.2
Heat Cycle	no change	-0.5 ~ -0.2	-0.8 ~ +0.2	-1.6 ~ +2.5

note) ΔE^*
illuminant: C
view angle: 2 deg

Mobile Use Without Compromise

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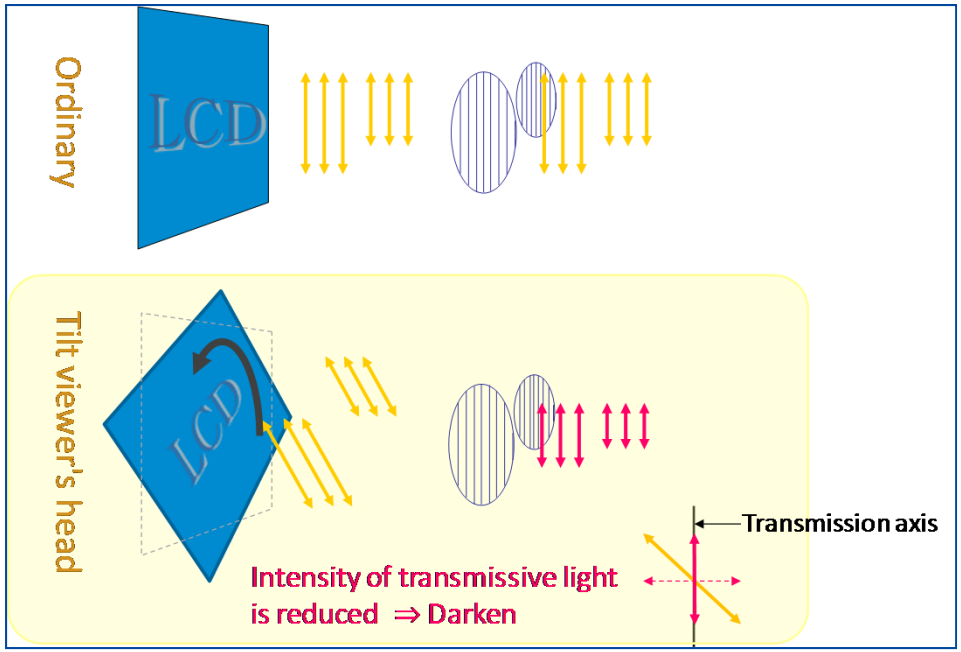
7. Dual-orientation sunglass readability is becoming “expected” by the consumer

Without ¼-wave film ➔ darkening:



Mobile Use Without Compromise

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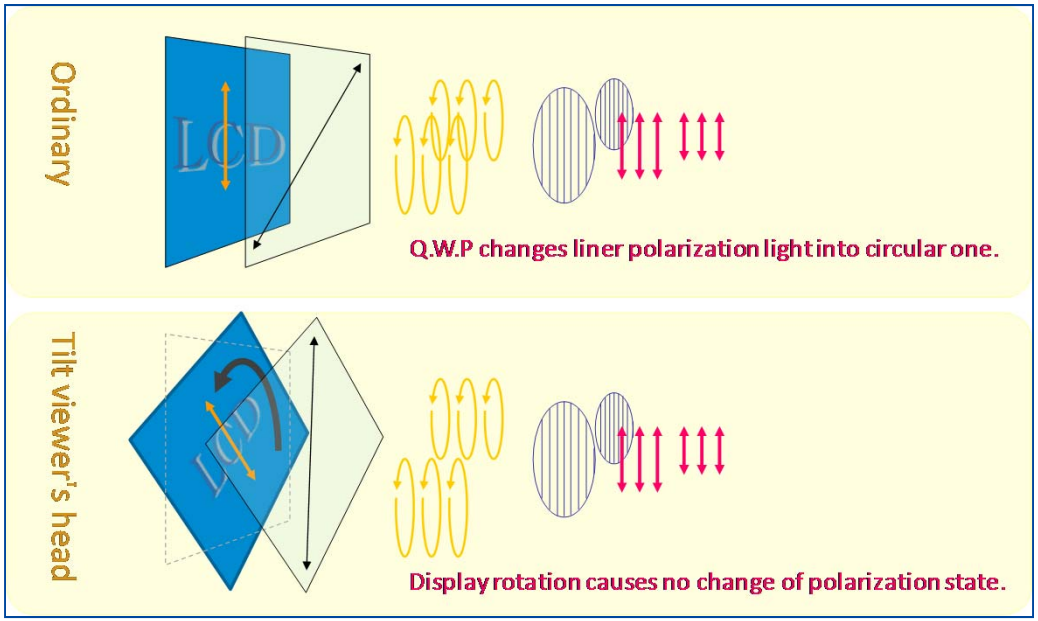
8. ZeonorFilm® ¼-wave films enable sunglass readability … in portrait + landscape

With ¼-wave film ➔ no darkening:



Sunglass Readable

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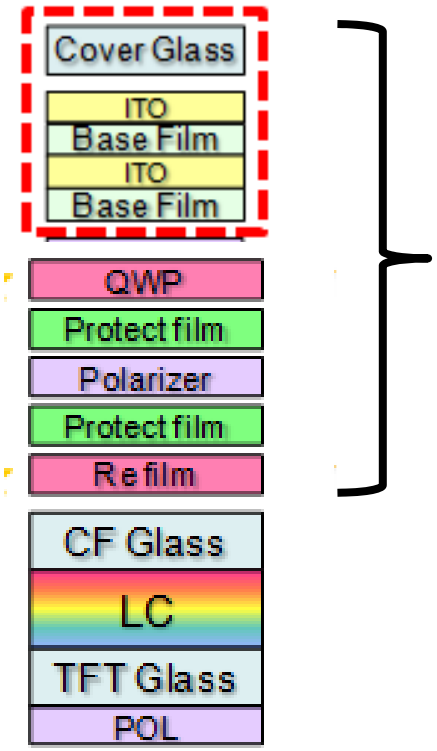
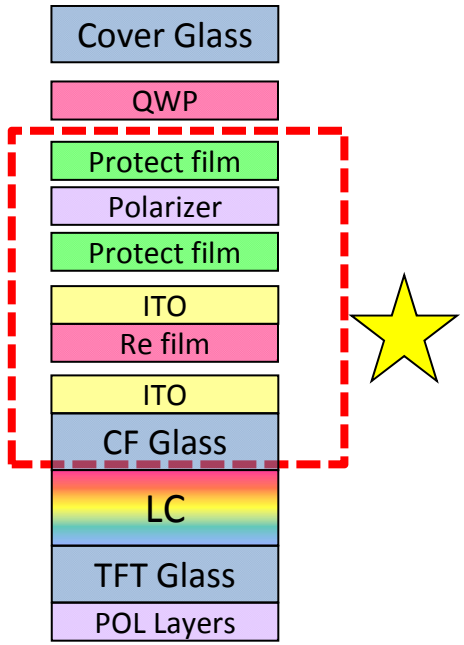
9. ZeonorFilm® can be used as <u>both</u> conductive film layer + sunglass readable layer

Traditional:



With ZeonorFilm ¼ wave retarder (Re film):



Thinner; Less Weight; Fewer Components; Less Cost; Sunglass Readable

Anti-Reflection Film for OLED

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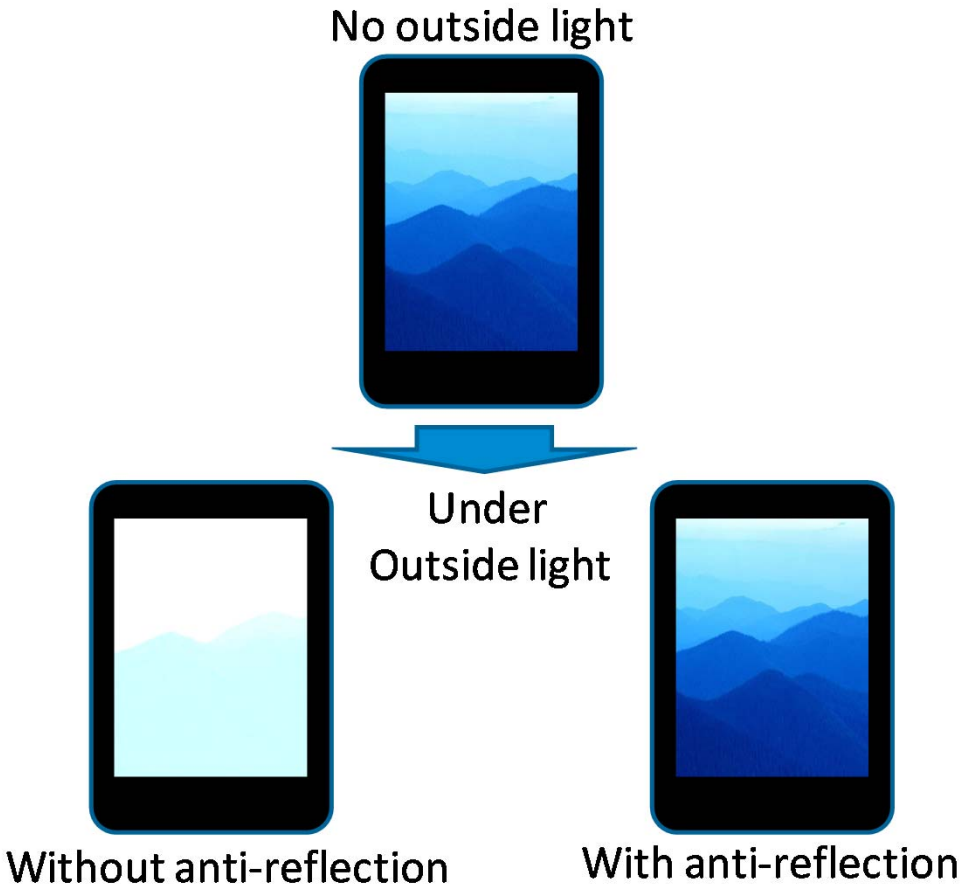
1. Without anti-reflective layer, OLED can suffer from high reflection (poor contrast)



Anti-Reflection Film for OLED

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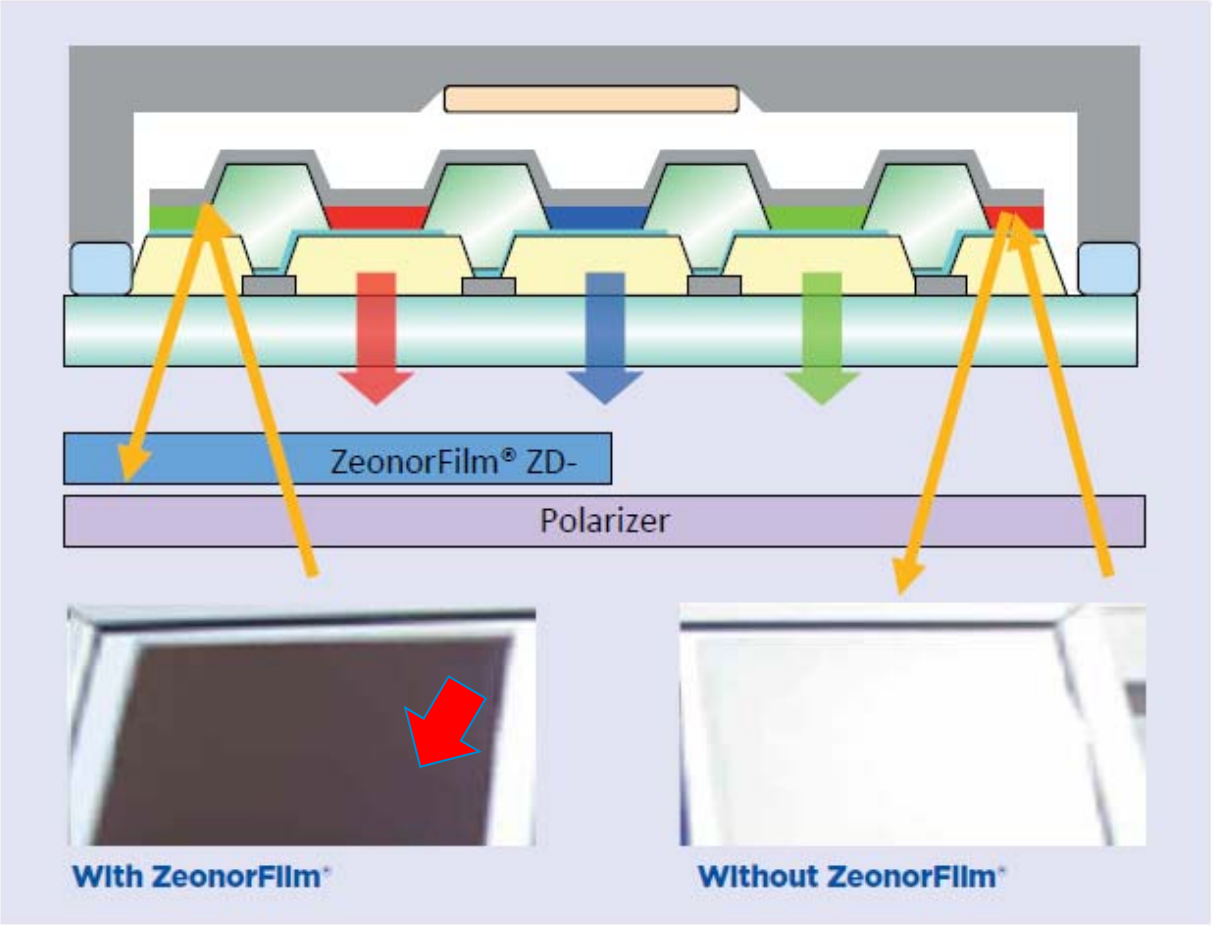
2. ZeonorFilm® ZD- series ¼-wave retarder cuts the reflection



Anti-Reflection Film for OLED

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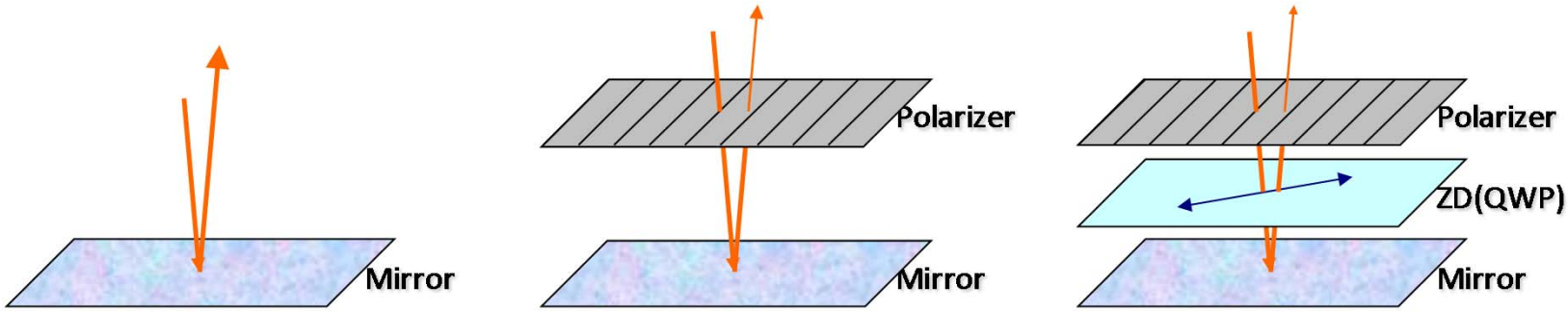
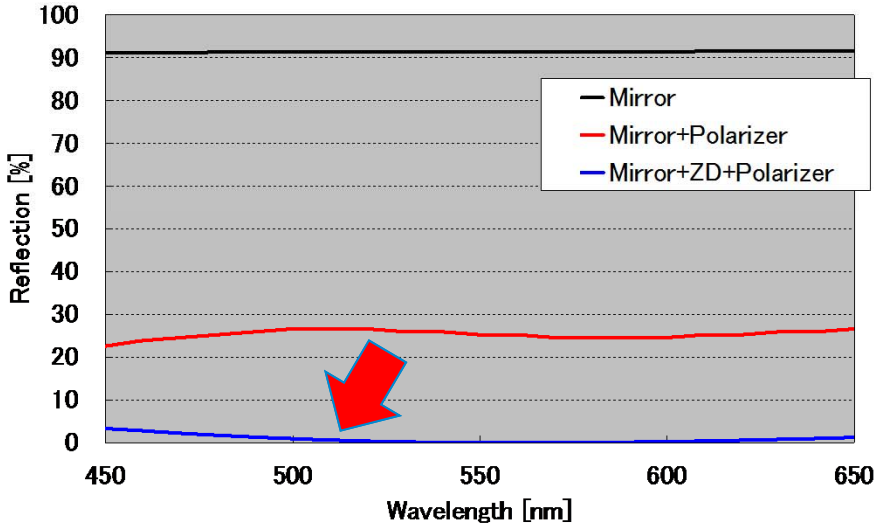
3. ZeonorFilm® ¼-wave film cuts the reflection





Anti-Reflection Film for OLED

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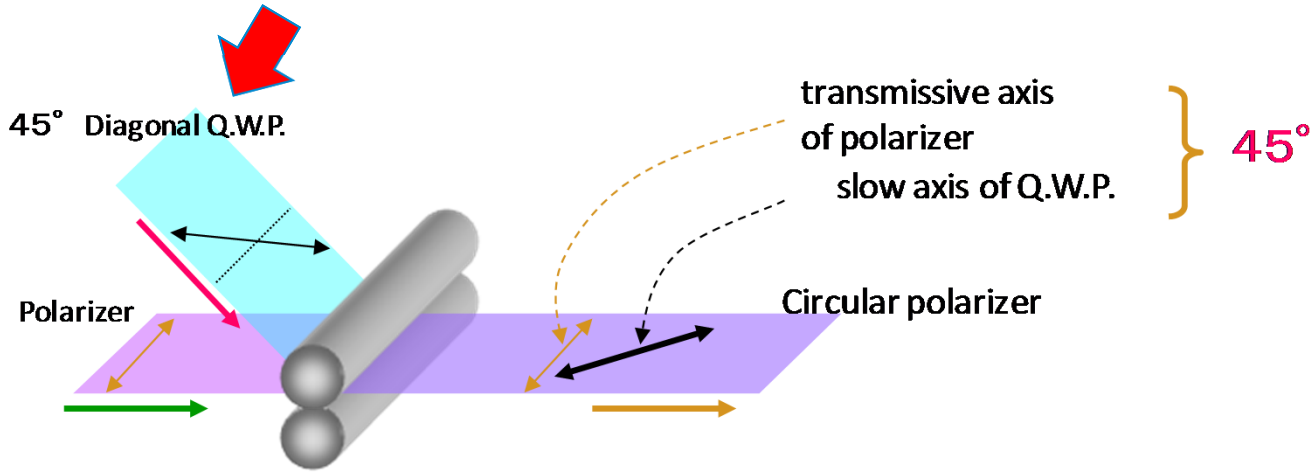
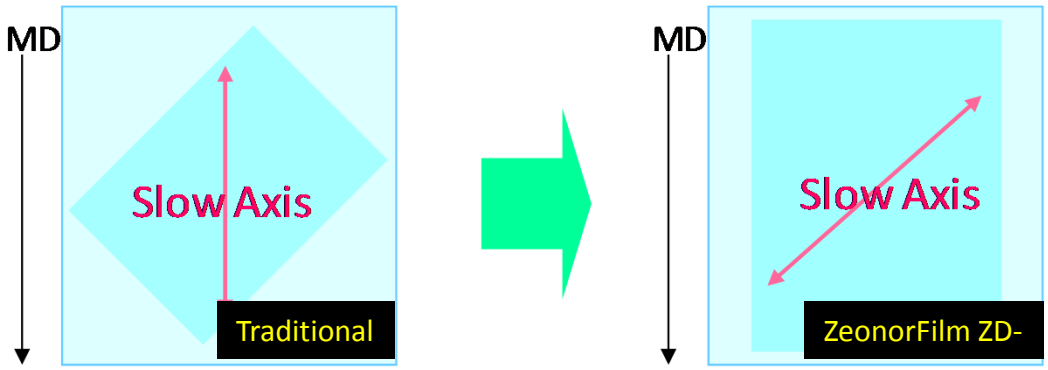
4. ZeonorFilm® ZD-series enables roll-to-roll processing … for high yield + efficiency



Increased yield + large-size ¼-wave plates



Optical Films Optimized for Display + Touch Panel

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Application	Function	Grade
For VA mode panel	Compensation	ZB12 series
For IPS mode panel	Compensation	ZI series, ZT series
	Polarizer protect film	ZF series
For Circular VA panel	Wave plate	ZM12 series, ZD12 series
For anti-reflection (OLED, touch panel)	Wave plate	ZM12 series, ZD12 series
For transparent conductive base film	Plastic base film	ZF series, ZM series, ZD12 series
For active 3D panel	Wave plate	ZD12 series
For PR base film	Plastic base film	ZF series

For Further Information

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