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# AR and NIR Shielding Film for PDP

New Business Group at Advanced Materials Division

## 1 Introduction

PDP (Plasma Display Panel) is big and thin, and has excellent moving image and digital quality, and is expected to be a main product for large flat screen TVs. Display performance of PDP has been improved to match CRT, and if cost is reduced, demand for PDP is expected to be 2 million in the 2003 fiscal year.

Under these circumstances, cost reduction of PDP components is imminent, thereby mass production technology to reduce cost of optical filter components (placed in front of modules) such as AR (anti-reflection) films, NIR (near infrared) shielding films, or electromagnetic shielding films is in demand.

Sumitomo Osaka Cement is developing a variety of functional films which can be mass produced at low cost by using wet coating technique which is a combination of nano-particle dispersion technique and thin film forming technique. We recently developed AR-NIR compound film for PDP, which has AR and NIR shielding functions, and commercialized it naming "CLEARAS AR/NIR." This paper explains the new product.

## 2 Characteristics of CLEARAS AR/NIR

- 1) It is formed by using serial wet coating technique; therefore, it can be mass produced at lower cost compared with using dry coatings such as vacuum deposition or sputtering.
- 2) It has both AR and NIR shielding functions in one; thus, in manufacturing procedure of optical filter for PDP surface, laminating process is reduced to only once compared with the conventional double layer laminations.
- 3) AR layer has high surface durability due to our own nano-particle dispersion technique.
- 4) The tone of translucent color is controlled on your request.
- 5) It has the ability to correspond to large-size PDP at 60~70 inches class.

## 3 Configuration of CLEARAS AR/NIR

Figure 1 shows configuration of CLEARAS AR/NIR. Our AR-NIR compound film consists of AR layer on the surface of PET (polyethylene terephthalate) film, and NIR shielding layer on the backside. NIR shielding layer is adhesive, and it is applied on to glass substrate, etc., then used as optical filter for PDP surface.

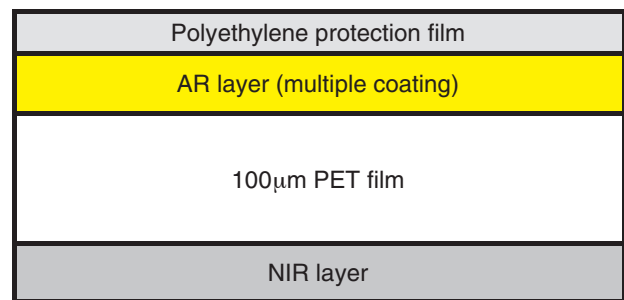


Fig.1 Configuration of CLEARAS AR/NIR

## 4 Properties of CLEARAS AR/NIR

Table 1 shows properties of CLEARAS AR/NIR. Also, Figure 2 and 3 show reflection spectrum and transmission spectrum, respectively. As shown in Table 1 and Figure 2, CLEARAS AR/NIR blocks 800~1100nm near infrared, and keeps transmittance under 10% on average, sustaining about 70% visible light transmittance.

Table 1 Characteristics of CLEARAS AR/NIR

items	values
Minimum reflectivity	1.2%
Total light transmittance	71.8
Haze	0.6
Spectroscopic transmittance	
820nm	14.5%
850nm	9.7%
950nm	4.3%
1000nm	3.9%
Chromaticity	
x	0.313
y	0.320
Surface resistance	$1 \times 10^{10} \Omega / \square$
Adhesion (cross cut)	100/100
Pencil lead hardness	3H
Steel wool durability (#0000, 250g pressure repeating for 10 rounds)	some scratches

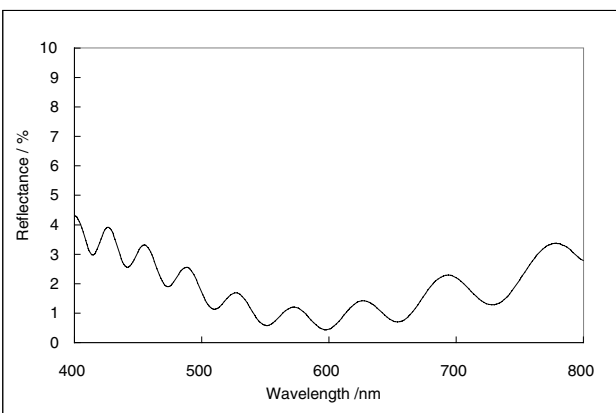


Fig.2 Reflection spectrum of CLEARAS AR/NIR

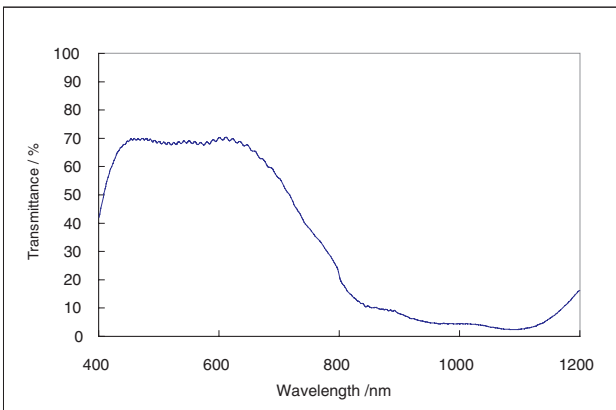


Fig.3 Transmission spectrum of CLEARAS AR/NIR

## 5 Conclusions

Sumitomo Osaka Cement AR-NIR compound film for PDP is a function film which has both AR and NIR shielding functions, can be mass produced at low cost by using wet coating technique. In addition, we are currently developing low reflection films using wet coating that achieves the same low reflectivity as films manufactured by using dry coating. Moreover, we are working on adding electromagnetic shielding function and wavelength selectivity absorption function to it.