Application Note
UV-0033

Evaluation of Privacy Films using an Automated Absolute Reflectance Measurement Accessory

Introduction

Privacy films for smartphone displays are used to prevent bystanders from viewing the user's phone. These films are composed of louver layers or transparent and light shielding layers that are interlaminated. Depending on the height and pitch of the louver layers, the screen view can be obstructed at specific viewing angles.

An absolute reflectance measurement accessory can be used to evaluate the viewing angle or the transmittance of the louver layers. By rotating the sample source and/or detector angles around the sample, transmittance values can be obtained for a variety of different viewing angles (Figure 2).

V-750
UV-Visible Spectrophotometer

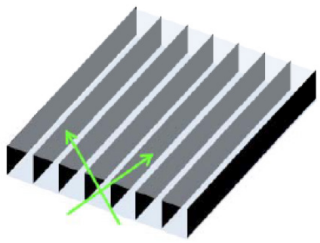

Figure 1. Structure of louver layer.

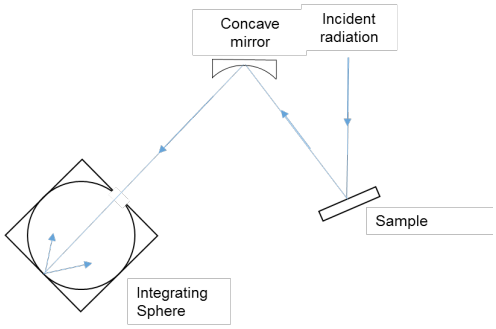

Figure 2. Schematic of absolute reflectance measurement accessory.

In this application note, the angle dependence of the transmittance spectra of a privacy film is studied using an absolute reflectance measurement accessory.

Keywords

V-750, UV-Visible/NIR, ARMN-919 Automated Absolute Reflectance measurement accessory, Materials, Films

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Experimental

Measurement Conditions			
Detection Angle	0°	Incidence Angle	-60-60°
Measurement Interval	2°	Measurement Mode	%T, asynchronous
Wavelength Range	380-780 nm	Bandwidth	5 nm
Scan Speed	400 nm/min	Response	0.96 sec

Results

The 3D plot in Figure 3 shows the transmittance spectra as a function of wavelength and incidence angle. Figure 4 illustrates the transmittance spectra at varying incidence angles and Figure 5 is the angle dependence transmittance spectra at 550 nm. These data reveal that the privacy film absorbs blue light below 400 nm while keeping the transmittance constant above 400 nm, indicating that the film displays light without inducing a large color change. Figure 5 shows a transmittance of 5% near the viewing angle of ±32.5°, suitable for user privacy.

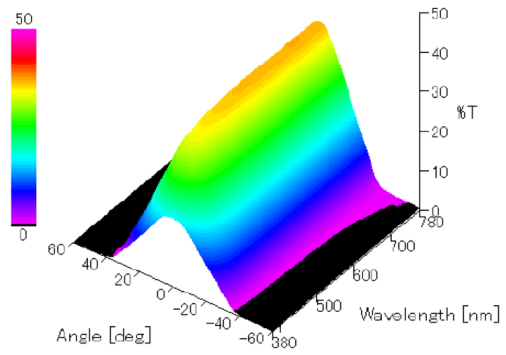

Figure 3. 3D plot of the transmittance spectra as a function of wavelength and incidence angle.

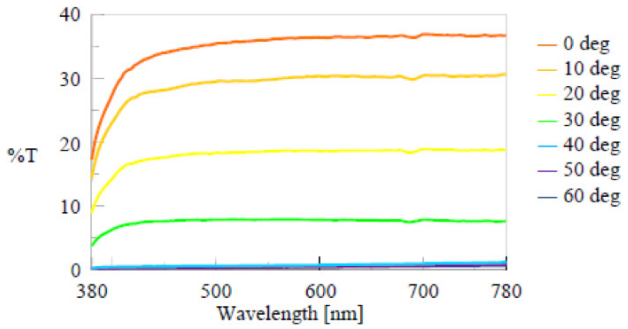

Figure 4. Transmittance spectrum of privacy film obtained every 10°.

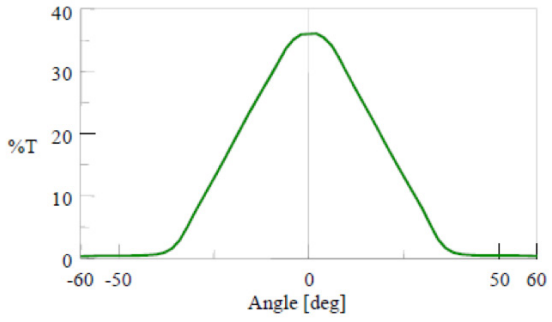

Figure 5. The angle dependence of the transmittance spectra at 550 nm.

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