

# Measurement Reproducibility of the Dielectric Multilayer by UH4150 Spectrophotometer - Comparison with the Lens Optical System of GG System -

## INTRODUCTION

The features of Model UH4150 include the installation of PG (prism-grating) monochromator and the application of collimated light beam. With the PG monochromator system, the change in the polarization characteristic is smooth and a stable baseline can be obtained. The collimated light beam compared with the focused light beam, the light beam rarely changes regardless of the sample resetting. As a result, a high measurement reproducibility can be obtained.

This time, the transmission spectrum (incident angle of 0 degree, 5 times resetting) of a dielectric multilayer substrate was obtained. The reproducibility was compared with that of the generally used GG (grating-grating) system spectrophotometer in the same instrument class.



## SAMPLE

Sample: Dielectric multilayer substrate

### INSTRUMENT CONDITIONS

Instrument : UH4150 Spectrophotometer

Measurement wavelength range : 300 - 1200 nm

Sampling interval : 0.5 nm

[UV/VIS]

Scan speed : 300 nm/min

Slit : 8 nm

[NIR]

Scan speed : 300 nm/min

Slit : Automatic control

PbS sensitivity : 4

### ACCESSORY

φ60 integrating sphere accessory  
(P/N : 1J1-0121)

Transmission holder (tight adhesion)  
(P/N : 1J0-0202)

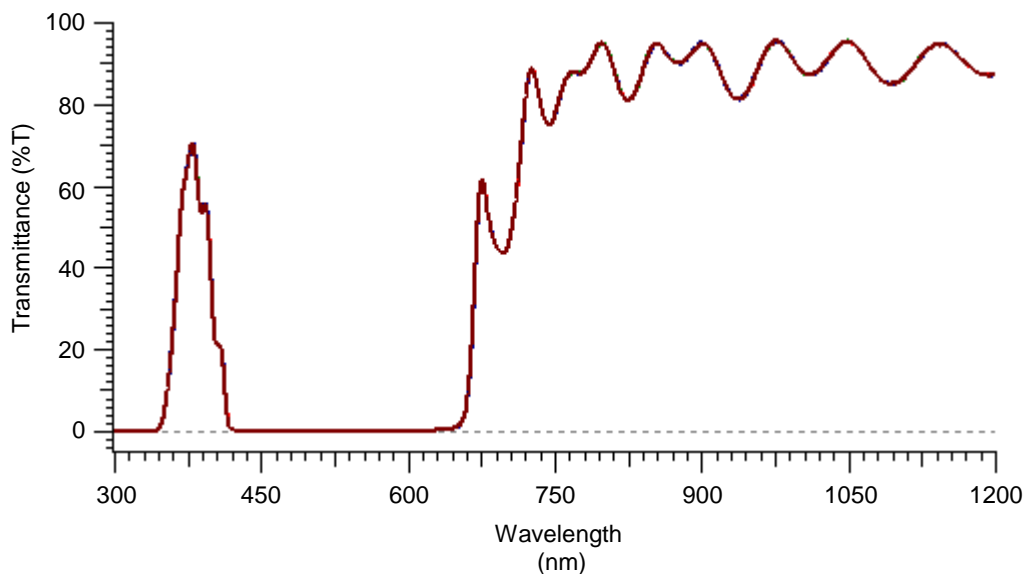


Figure 1 Result of Transmission Spectrum Measurement for Dielectric Multilayer by UH4150  
(Overlaid Spectra Based on 5 Times Resetting)

### KEY WORDS

Material/Processing Material Related, Glass/Ceramic, Dielectric Multilayer Substrate, Transmission Spectrum, Spectrophotometer, Reproducibility, Prism., UH4150

Spectrophotometer (UV)

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## Measurement Reproducibility of the Dielectric Multilayer by UH4150 Spectrophotometer - Comparison with the Lens Optical System of GG System -

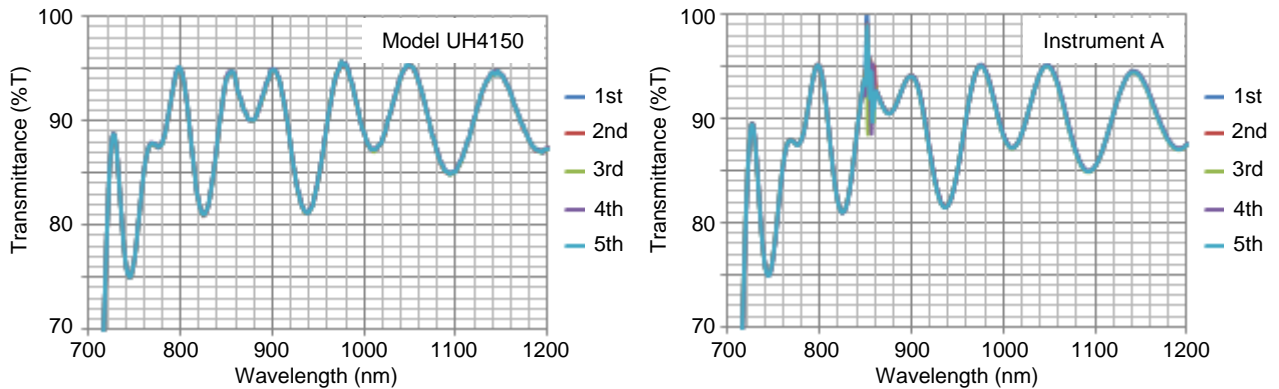


Figure 2 Enlarged Spectrum at 700 nm - 1200 nm

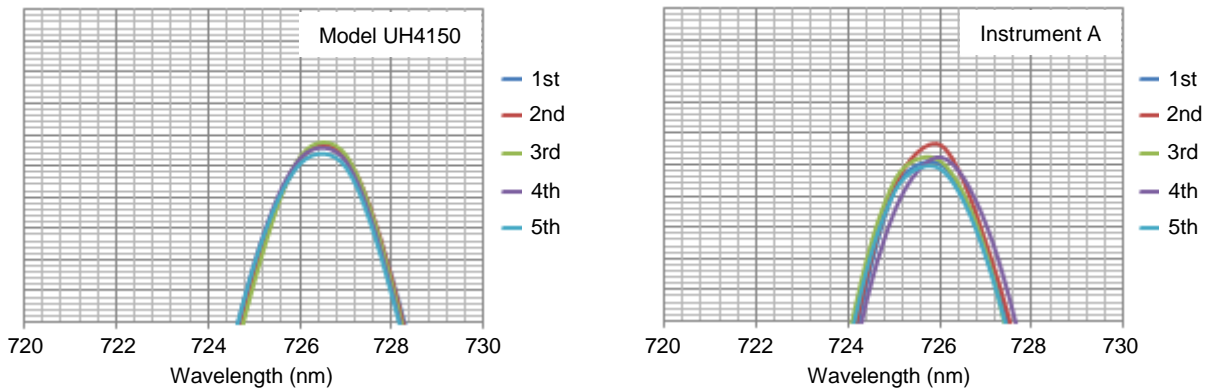


Figure 3 Enlarged Spectrum at 720 nm - 750 nm

Table 1 Comparison of Measurement Reproducibility (Reproducibility for 5 times resetting)

Wavelength (nm)	UH4150 Spectrophotometer	Generally used GG system spectrophotometer of the same instrument class
1000	0.06%	0.07%
950	0.05%	0.07%
900	0.06%	0.50%
850	0.08%	0.12%
800	0.06%	0.07%
750	0.08%	0.18%
700	0.44%	0.89%
400	0.19%	0.24%

The measurement reproducibility for a dielectric multilayer substrate was compared with that of the generally used GG (grating-grating) system spectrophotometer in the same instrument class (hereinafter, referred to as Instrument A). In Figure 2, the spectra over a range of 700 nm – 1200 nm were compared. There is no signal level difference at about 860 nm in UH4150 spectrophotometer. However, there is a signal level difference associated with the noise in Instrument A. In Figure 3, the reproducibility was studied focusing on the peak at around 726 nm. While Instrument A employs focused light beam, collimated light beam is applied by UH4150 with the PG system. Therefore, the light beam rarely changes regardless of the sample resetting and a high measurement reproducibility can be obtained.

Instrument A: Generally used GG system spectrophotometer of the same instrument class (lens optical system)

### KEY WORDS

Material/Processing Material Related, Glass/Ceramic, Dielectric Multilayer Substrate, Transmission Spectrum, Spectrophotometer, Reproducibility, Prism., UH4150

Spectrophotometer (UV)

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