

# Conversion from Relative Value to Absolute Value about Quartz

## INTRODUCTION

Five-degree specular reflectance accessory (relative) allows the analysis of low reflectance sample with a good S/N and used for the reflectance measurement of thin film deposited on a substrate. The refractive index of BK7 used as the reflectance standard is known and the theoretical value calculated based on the refractive index matches the absolute reflectance measured by U-4100 (Figure 2). By using the option package, the absolute value can be easily determined based on the relative measured by U-3900H.

## SAMPLE

Sample : Quartz substrate (φ30 mm), Reflectance standard: BK7 (φ30 mm)

### INSTRUMENT CONDITIONS

### ACCESSORY

Instrument : U-3900H spectrophotometer	[UV/VIS] Measurement wavelength : 300 - 900 nm Scan speed : 300 nm/min Sampling interval : 1 nm
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5° specular reflectance accessory  
(P/N : 130-0630)  
option package

Instrument : U-4100 spectrophotometer (Solid sample measurement system)	[UV/VIS] Measurement wavelength : 340 - 900 nm Scan speed : 300 nm/min Sampling interval : 1 nm
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5° specular reflectance accessory  
(P/N : 134-0102)

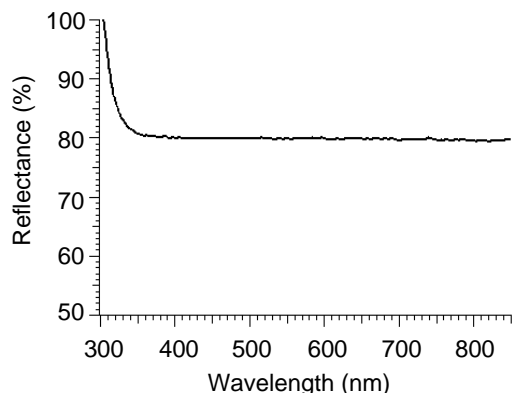


Figure 1 Relative Reflectance of Quartz Substrate by U-3900H (Reflectance standard: BK7)

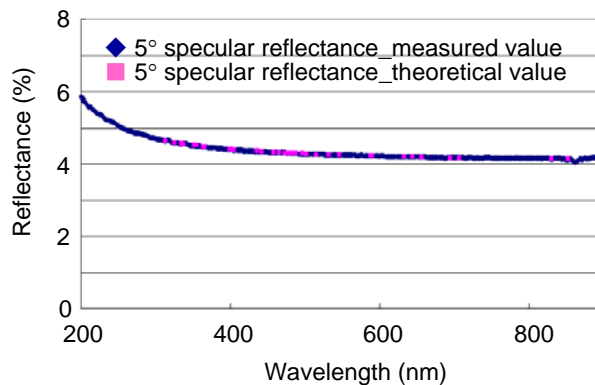


Figure 2 Absolute Reflectance of BK7 (U-4100) and Theoretical Value

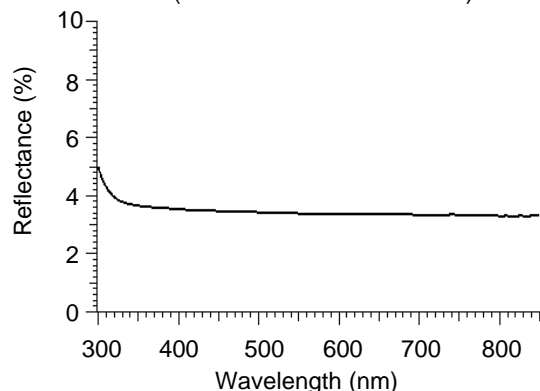


Figure 3 Absolute Value Conversion for Quartz Substrate

Formula for absolute value conversion

$$\text{Relative reflectance (\%)} \times \text{absolute reflectance (\%)} \times 0.01 = \text{converted absolute value (\%)}$$

### KEY WORDS

Material-Processing Material Related,  
Other Material-Processing Material Related, Quartz Substrate, BK7,  
Relative Reflectance, Absolute Value Conversion, Absolute Reflectance,  
Spectrophotometer, Quartz, Glass, BK7, Refractive Index, Absolute,  
Conversion, U-3900H, U-4100

Spectrophotometer (UV)

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