

HITACHI
Inspire the Next

Hitachi High Technologies America, Inc.

Measurement of the Spectroscopic Properties of Optical Components for CD-DVD Players Using the Microsample Measurement Accessory

Stephen T. Watts, Hitachi High Technologies America, Inc.

Kazuyo Miura and Takayuki Wakui, Hitachi High Technologies Corporation

Miniaturization and advanced technologies of lenses used on devices such as cellular phone cameras and CD-DVD players have advanced in recent years. Therefore, greater quality control is now required for these optical components. The Hitachi U-4100 UV-VIS-NIR spectrophotometer is fully customizable and is an ideal tool for measuring the spectroscopic properties of optical components. Measurement of the transmittance of a pick-up lens for CD-DVD players using the Hitachi U-4100 with the microsample measurement accessory is described below.

Measurement of a Pickup Lens

It is difficult to focus and center the sample beam on a pickup lens of a CD-DVD player. However, measurement of such extremely small samples can be performed easily using the U-4100 equipped with the microsample measurement accessory (Figure 1). This accessory installs easily and consists of a condenser, reference beam aperture and sample holder. The sample beam is focused with the condenser and centered on the sample. The reference beam is adjusted by the aperture to have the same amount of energy as the sample beam for improved signal-to-noise. The sample is fixed to the holder which in turn is attached to rest of the accessory. The sample holder can also be customized to accommodate various sample shapes and sizes. The pickup lenses analyzed here were only 6 mm in diameter.

A full integrating sphere is used when measuring samples that greatly diffuse the transmitted light such as a lens. For the standard sphere coated with barium sulfate and equipped with white plates of aluminum oxide on the back opening, the reflectance differs on the white plates and the sphere coating. This will cre-

ate optical differences between the baseline correction and the sample measurement. The use of a full sphere eliminates these optical differences.

The transmittance spectrum of pickup lenses using the Hitachi U-4100 equipped with the microsample accessory and the 60 mm full integrating sphere coated with barium sulfate is shown in Figure 2. The emission wavelengths of the laser of CD and DVD players are 780 nm and 650 nm, respectively. Very high transmittance was evident with both lenses.

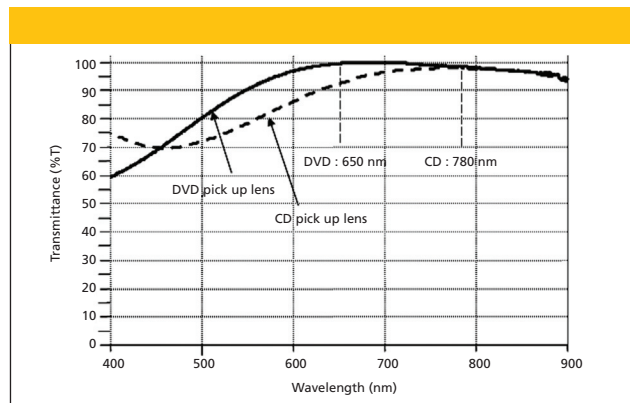


Figure 2: Transmittance spectra of pickup lens on CD and DVD player.

Conclusions

Hitachi continually strives to provide the most technologically advanced solutions to the life science industry. Another example of that dedication is evident in the Hitachi U-4100 UV-VIS-NIR Spectrophotometer which can be outfitted with many different accessories for a broad range of applications.

References and Endnotes

- (1) K. Miura, T. Wakui. Hitachi Technical Data, UV-VIS No. 78.
- (2) H. Yamada. Hitachi Technical Data, UV-VIS No. 75.

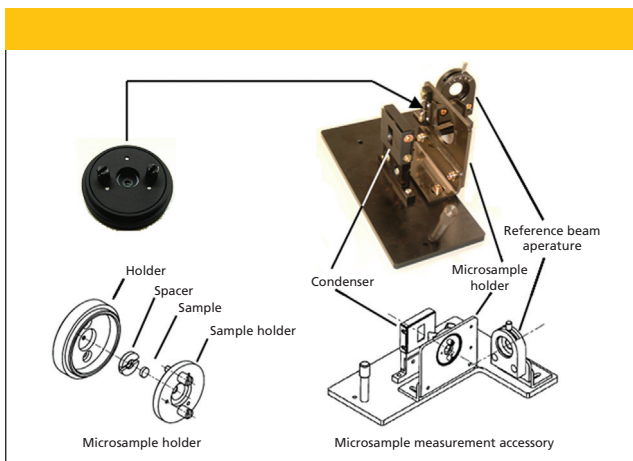


Figure 1: The microsample measurement accessory.

Hitachi High Technologies America, Inc.

Life Sciences Division

3100 North First Street

San Jose, CA 95134

Tel. (800) 548-9001, Fax. (408) 432-0704

sales-LS@hitachi-hta.com, www.hitachi-hta.com/LShome