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Application News

No.A523

Spectrophotometric Analysis

Simultaneous Measurement and Visual Observation: Transmittance Measurement of Multilayer Film

By using the AIM-9000 infrared microscope together with AIMsolution Analysis software, measurement points can be visually observed at the same time as a spectrum is measured for the corresponding point.
In this example, a multilayer film sample is analyzed using simultaneous visual observation and spectral measurement.

Measurement of Multilayer Film

A microscope image of a 20 µm thick cross-section of multilayer film, sliced using a microtome, is shown in Fig. 1. Fig. 1 shows that the film consists of at least four layers.
The spectrum was measured by the transmission method, with the sliced multilayer film held horizontally. First, the sample and background (BKG) measurement points were specified, as shown in Fig. 2. In this case, a location where there is no film (air) was specified as the BKG position. The aperture sizes were set to 50 × 50 µm for measurement points 1 and 4, and 20 × 50 µm for measurement points 2 and 3.
The aperture size of the BKG point needs to be the same as that of the measurement point. If multiple measurement points with different sizes are selected, BKG is measured with the aperture automatically matched to the respective measurement point size. Measurement conditions are indicated in Table 1.

Results

An image of the microscope area and the spectrum from each point are shown in Fig. 3.
After the measurements were finished, the AIMsolution Analysis software launched automatically to make it easy to perform data processing and spectrum searches. A screenshot from the AIMsolution Analysis software is shown in Fig. 4. Measurement points and spectra are color-coded to make them easier to correlate. Furthermore, search results show the acquired spectrum at the top, a spectral hit in the middle, and the hit list at the bottom, as shown in Fig. 5.
That provides powerful support to analysts by providing a smooth process flow from confirming the measurement points, measurements, to analyzing the resulting data.

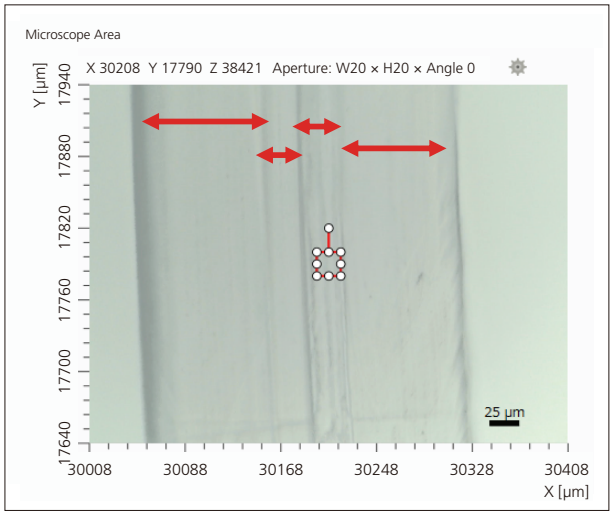

Fig. 1 Microscope Image of Multilayer Film Cross-Section

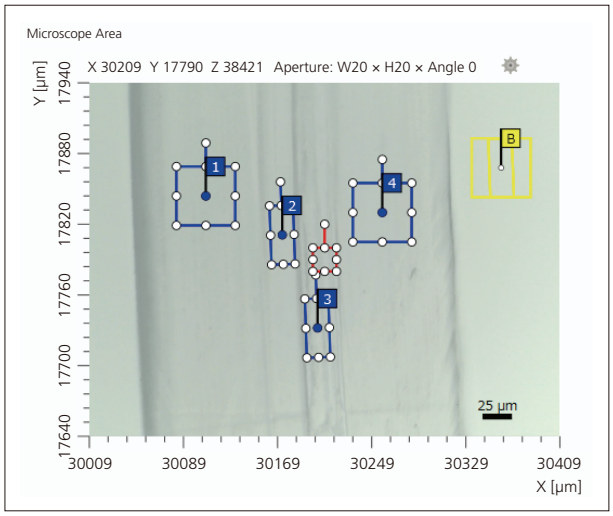

Fig. 2 Image Showing Measurement Points

Table 1 FTIR Measurement Conditions

Instrument	: IRTracer-100 AIM-9000
Resolution	: 8 cm^{-1}
Accumulation	: 10
Apodization	: SqrTriangle
Detector	: MCT
Aperture	: 20 × 50 µm, 50 × 50 µm

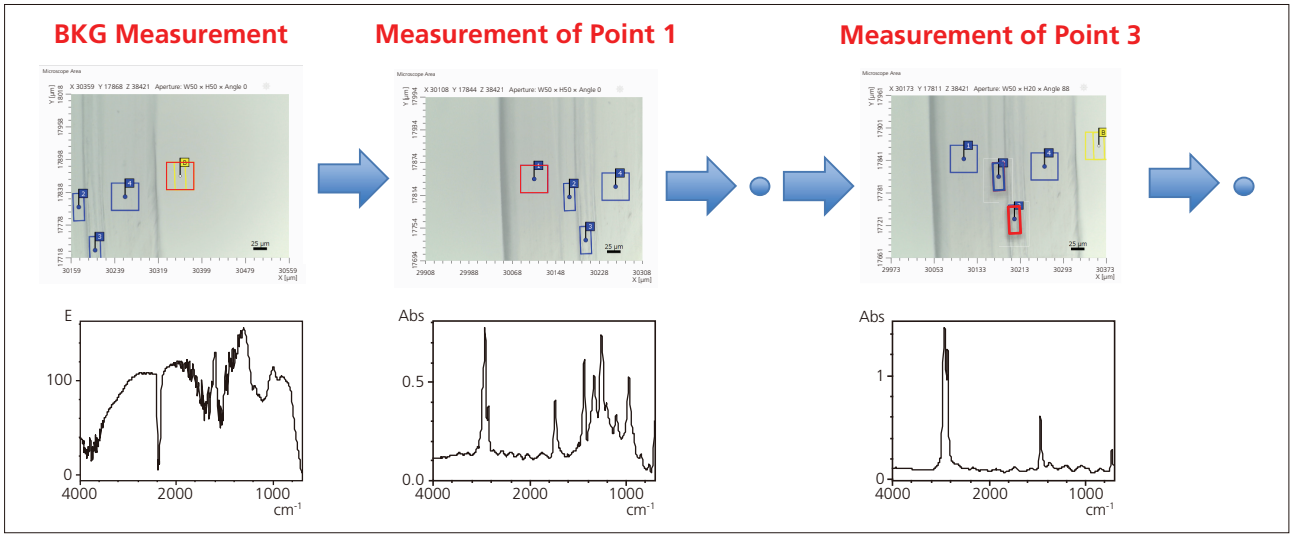

Fig. 3 Microscopic Images During Measurements and Measured Spectra

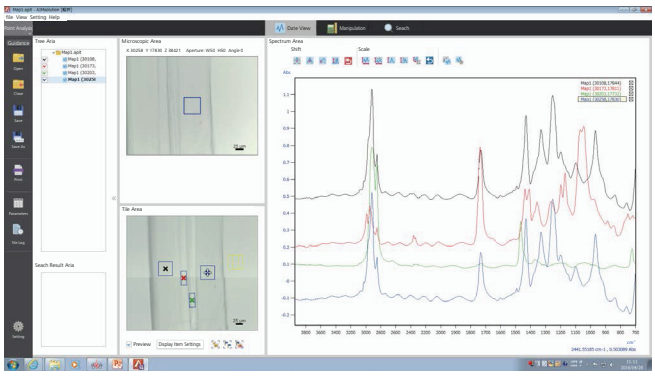

Fig. 4 Screenshot of AIMsolution Analysis Software

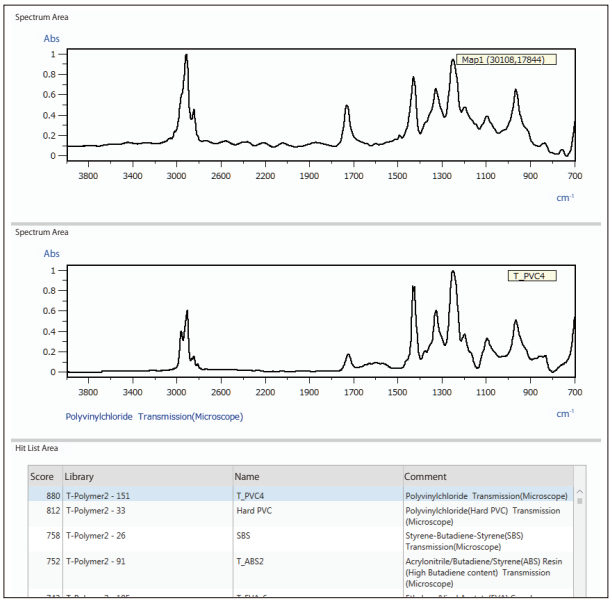

Fig. 5 Search Results

Conclusion

This simultaneous visual observation and measurement example showed how both images and spectra from measurement points can be viewed simultaneously in real time.
AIMsolution Analysis software displays each measurement point color-coded with the same color as the corresponding spectrum, which makes it visually easier to understand. The software also makes it easy to perform data processing, such as atmospheric correction and searches.
In this way, by using the AIM-9000 microscope with AIMsolution Measurement software for sample analysis and AIMsolution Analysis for data analysis, the system is able to immediately, during any step, provide more reliable information and a stress-free sample analysis workflow.

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