

Foreign material analysis by using ATR PRO ONE VIEW

Introduction

Various FTIR methods for identifying a foreign material or contaminant exist such as infrared microscopy when the particle size is on the order of few microns. When the target can be confirmed visually it is typically on the order of several hundred microns and does not require an infrared microscope. A macro ATR method is a suitable alternative and offers advantages such as: no sample preparation, non-destructive, and easy-handling.

One of the important point of the ATR measurement is the intimate contact between the sample and the ATR prism. In the case of a conventional ATR accessory, the user cannot ensure where the sample is contacting the prism making it difficult to know whether contact is with the bulk sample or with the foreign contaminant.

JASCO's latest FTIR accessory, ATR PRO ONE VIEW, can provide a direct visualization of the sample area in contact with the ATR prism. This feature is quite effective to measure foreign materials on opaque substrate (paper, plastic, metal, etc.).

This application note shows the example of foreign material analysis using the ATR PRO ONE VIEW.

Measurement

Sample: foreign material on paper

<Measurement Condition>

Instrument:	FT/IR-4600
Measurement Method:	ATR
Accessories:	ATR PRO ONE VIEW
Detector:	DLATGS
Prism:	Diamond
Accumulation:	50
Resolution:	4cm ⁻¹



Fig.1 ATR PRO ONE VIEW

Figure 2 shows the picture of the sample. Figure 3 shows the observation image of the target contacted with prism. As shown in Figure 3, ATR PRO ONE VIEW can hold the target on the prism properly.

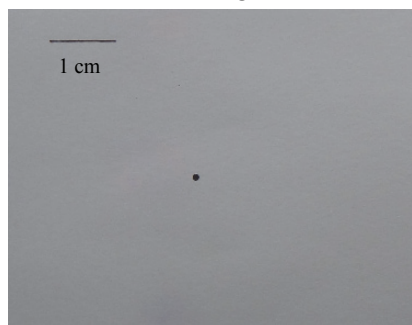


Fig.2 Picture of foreign material on paper

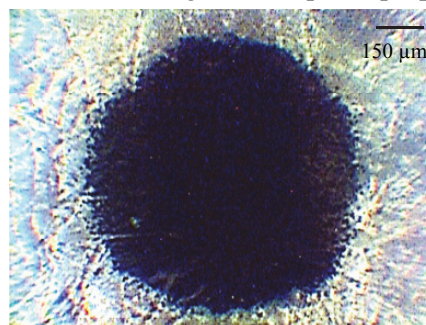


Fig.3 Sample observation image by using ATR PRO ONE VIEW

Result

Figure 4 shows the spectra of paper and foreign material on paper.

From the upper spectrum, O-H peak (around 3300cm^{-1}) and C-O-C peak (around 1000cm^{-1}) are confirmed indicating the main component is cellulose.

From the lower spectrum, the peaks ascribed to cellulose, C-H peak (around 2900cm^{-1}) and C=O peak (around 1720cm^{-1}) are confirmed.

In order to identify the foreign material, the subtraction spectrum was calculated and searched through a spectral database identifying the foreign material as a polyester.

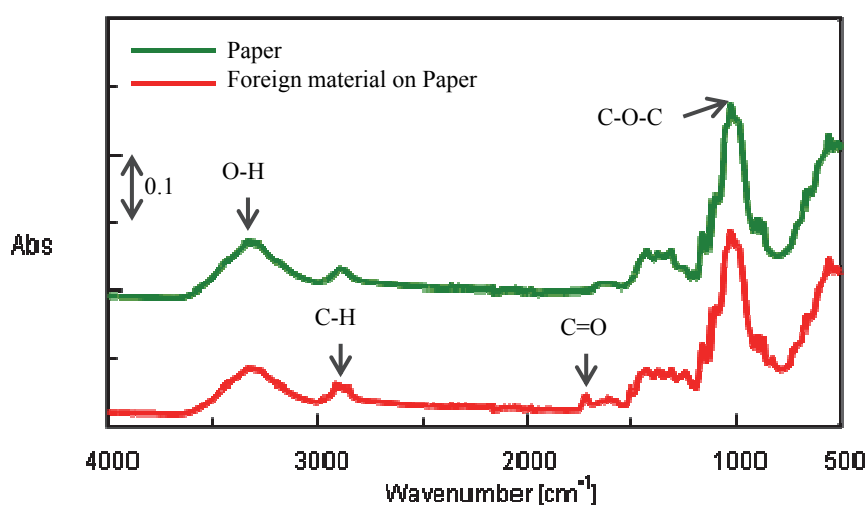


Figure 4 Spectra of paper (upper) and foreign material attached paper (lower)
*vertical axis is offset.

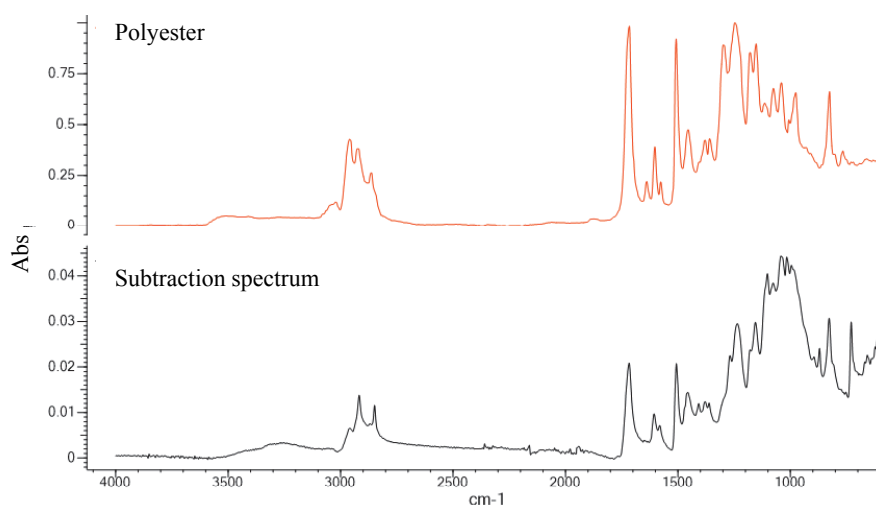


Figure 5 Database search result of subtraction spectra