

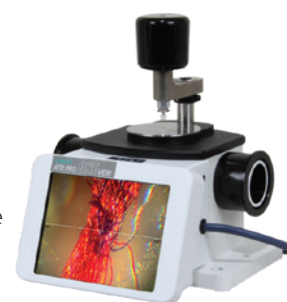
## Observation and Measurement of Foreign Material Analysis using ATR PRO ONE VIEW

### Introduction

There are various FTIR methods that can be used to identify foreign material or contaminants. FTIR microscopy is used for foreign material where the size is in the order of few microns, but when a sample with foreign material can be observed by the naked eye, the particle typically is typically greater than several hundred microns and does not require an FTIR microscope. A macro ATR method may be a suitable alternative and offers advantages such as minimal sample preparation, non-destructive measurement and easy-handling.

A key requirement for high quality ATR measurement is full contact between the sample and ATR prism. In the case of a conventional ATR accessory, the user cannot ensure whether the prism is in direct contact with the foreign contaminant or not. JASCO's latest FTIR accessory, the ATR PRO ONE VIEW provides real-time visualization of the sample area in contact with ATR prism. This feature is highly effective for the measurement of foreign materials on opaque substrates such as paper, plastic and metal.

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



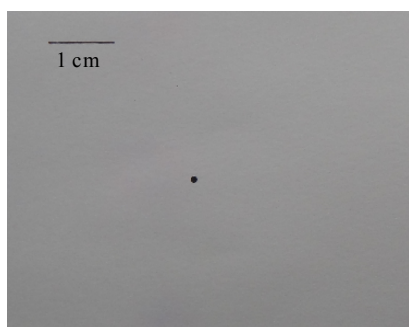
ATR PRO ONE VIEW

| Measurement  |                              |
|--------------|------------------------------|
| Sample       | Foreign material, paper, ATR |
| Instrument   | FT/IR-4600                   |
| Method       | ATR                          |
| Detector     | DLATGS                       |
| Accumulation | 50                           |
| Resolution   | 4cm <sup>-1</sup>            |
| Prism        | Diamond                      |

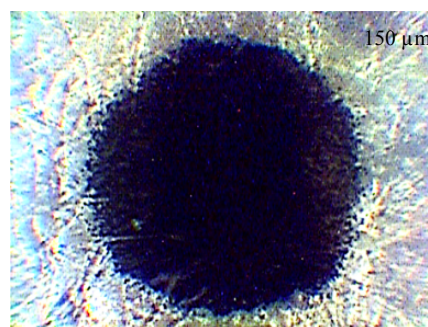
### Keywords

ATR, foreign material, FTIR, cellulose, paper analysis, polyester, image analysis

Figure 1 shows the picture of the sample. Figure 2 shows the observation image of the target in full contact with the prism.



**Figure 1.** Optical image of foreign material on paper

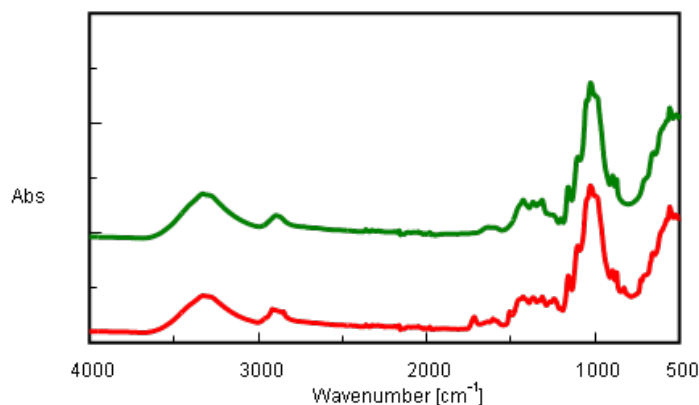


**Figure 2.** Sample image using ATR PRO ONE VIEW

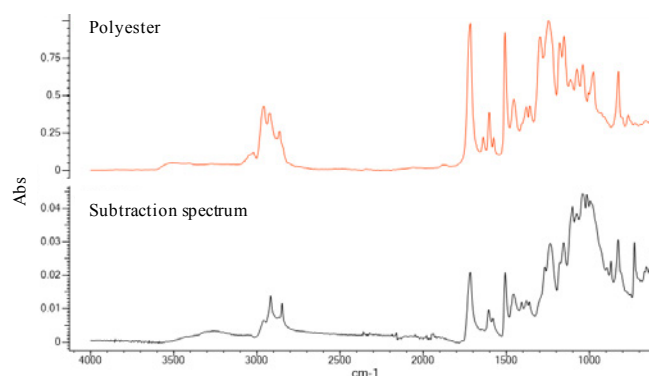
## Result

Figure 3 shows the spectra of paper and foreign material on paper. In the upper spectrum, the O-H peak (around  $3300\text{cm}^{-1}$ ) and C-O-C peak (around  $1000\text{cm}^{-1}$ ) confirmed that the main component is cellulose. In the lower spectrum, C-H peak (around  $2900\text{cm}^{-1}$ ) and C=O peak (around  $1720\text{cm}^{-1}$ ) are not attributed to cellulose.

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



**Figure 3.** Spectra of paper (upper)  
and foreign material attached paper (lower)  
\*vertical axis is offset



**Figure 4.** Database search result of  
subtraction of spectra