

## 2.21 Analysis of multi-layer films using an infrared microscope - FTIR

### •Explanation

Multi-layer films are often used in the packaging of food products and medical supplies. The most common method used to identify the components in each layer of multi-layer films involves slicing a section of the film and measuring the sample fragment gained by the transmission method using an infrared microscope. With this method, the spectrum of a layer can be measured if the film thickness is more than approximately 10 $\mu$ m.

before crushing, and Fig. 2.21.2 is the magnified image after crushing.

The spectra of each layer 1 to 7 indicated in Fig. 2.21.2 are shown in Fig. 2.21.3. The spectra of each layer shows absorption thought to be due to polyethylene terephthalate for the 1st layer, polyethylene for layers 2, 6, & 7, nylon for the 3rd layer, and ethylene vinyl acetate for the 4th and 5th layers.

### •Pretreatment / Results

A section of the film was sliced using a microtome set to a thickness of 10 $\mu$ m. The fragment gained is placed on top of the diamond cell and crushed. The resultant substance is measured using an infrared microscope. Fig. 2.21.1 is a magnified image of the sample fragment

### •Analytical Conditions

Resolution :8cm<sup>-1</sup>

Accumulation :100

Apodization :Happ-Genzel

Detector :MCT

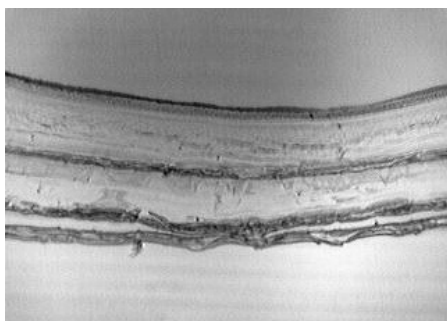


Fig. 2.21.1 Magnified image of the sample fragment

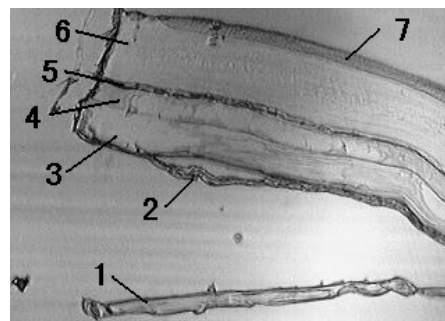


Fig. 2.21.2 Magnified image of the sample fragment after compression

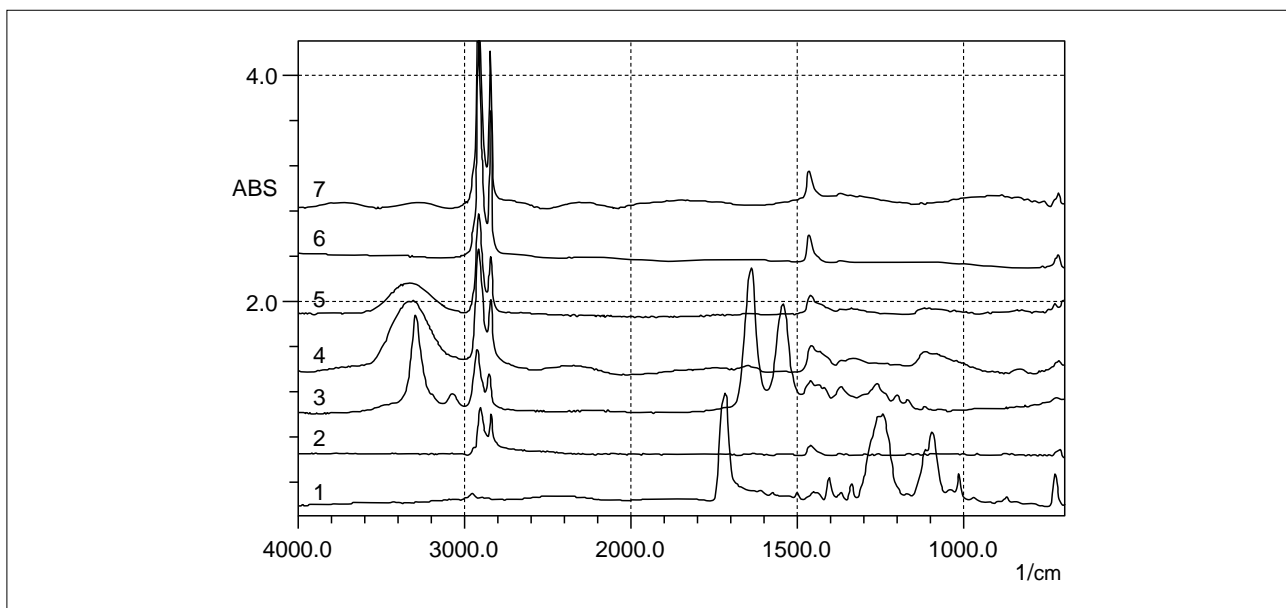


Fig. 2.21.3 Infrared spectra of each layer