

Determining of Additives in Rubber Hose using Supercritical Fluid Extraction

Polymers or plastics for use in industrial products usually contain additives as stabilizers or preservatives. Analysis of these additives has generally been performed using HPLC or IR procedures after extracting the additives using an appropriate solvent. However, detection and identification of such additives can be performed with shorter analysis time using SFE (supercritical fluid extraction) with FTIR.

Figure 1 shows the IR spectra data obtained for the extraction process. Figure 2 shows the time course data at specified peak wavenumbers of both 1732 cm^{-1} and 1608 cm^{-1} . These extraction patterns suggest that only one component was extracted. As an example, Figure 3 shows the extraction spectrum obtained at an extraction time of 5 minutes. The extraction spectrum was identified as DOP (dioctyl phthalate) using search software. For confirmation, Figure 4 shows the standard DOP spectrum when using SFE. The obtained spectrum (Figure 3) matches the standard spectrum of DOP (Figure 4), revealing that the additive is DOP.

Condition

Sample weight:	2 g
Pressure:	200 kg/cm^2
CO ₂ flow rate:	2 mL/min
Temperature:	50°C
Accumulation :	4 times
Measurement time:	20 min.

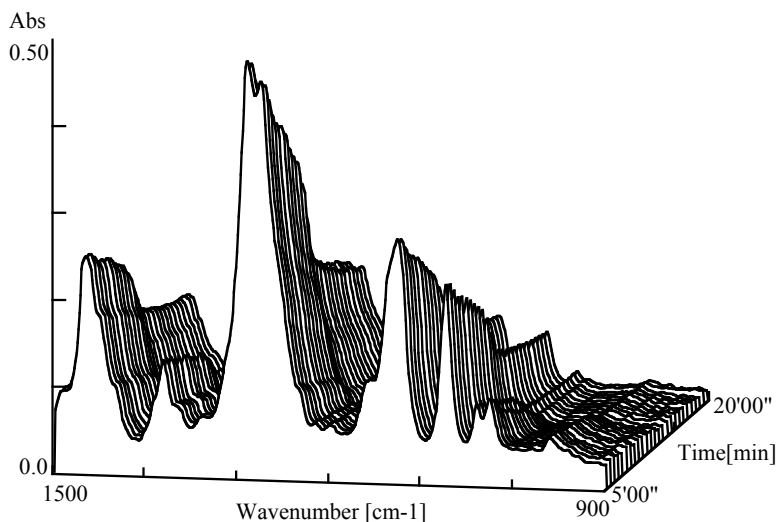


Fig.1 Supercritical fluid extraction spectra of rubber hose

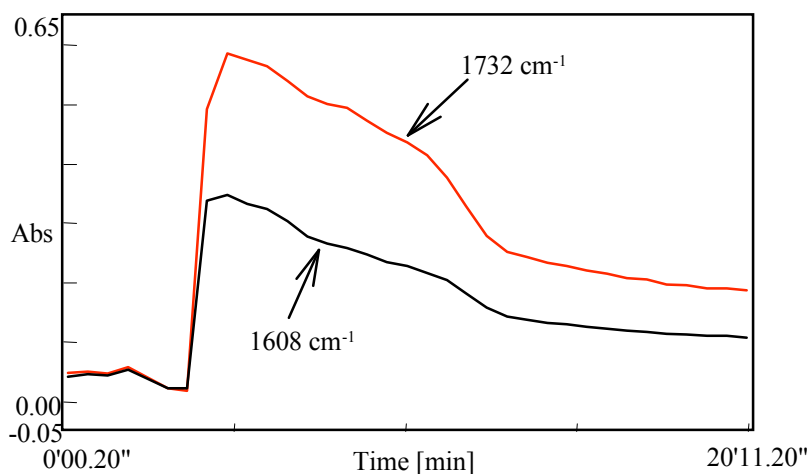


Fig.2 Time course data at specified wavenumbers

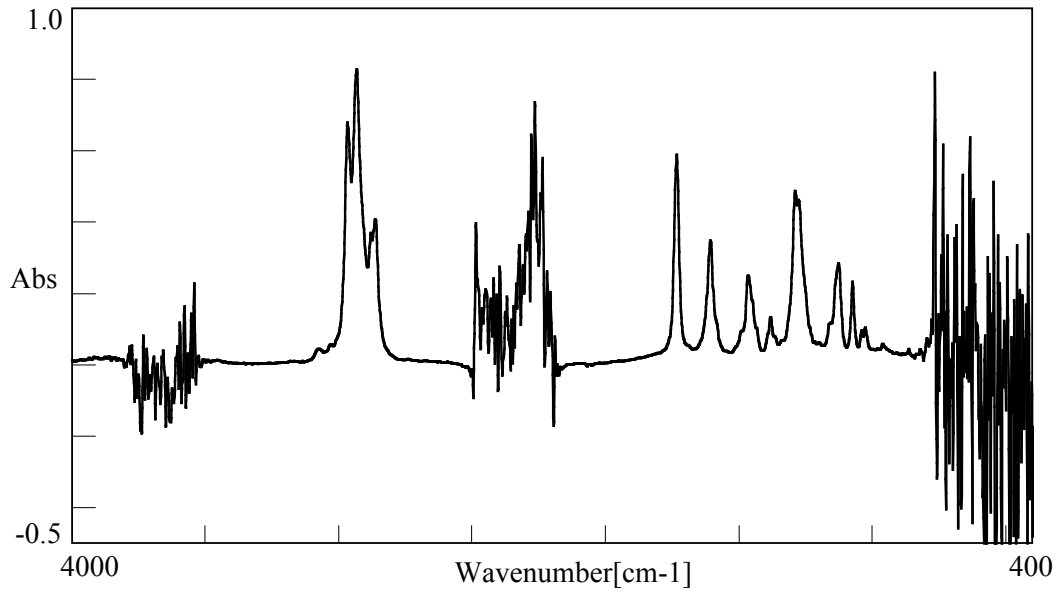


Fig.3 Extracted spectrum of rubber hose

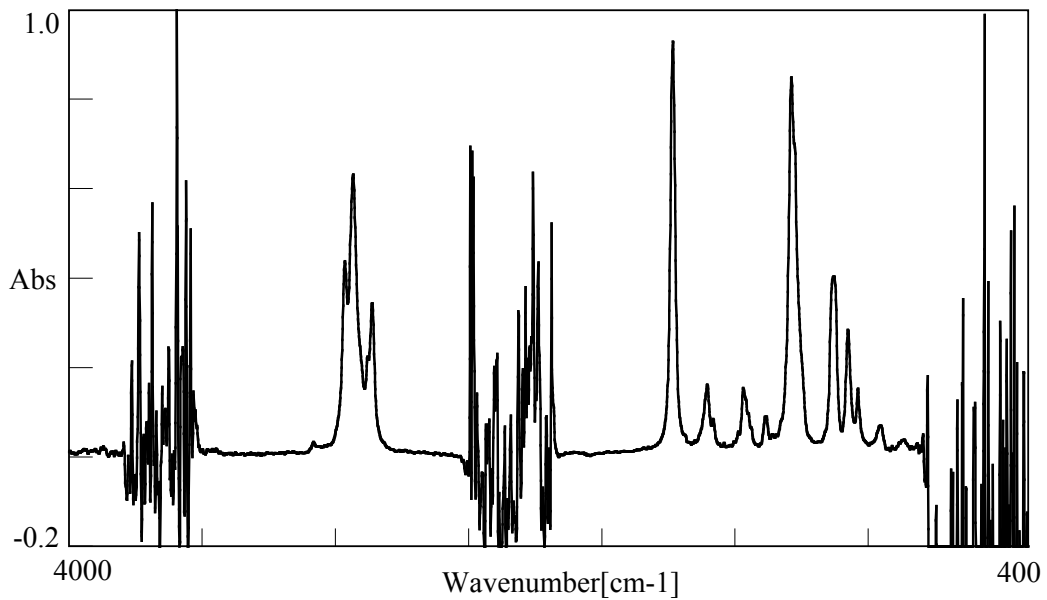


Fig.4 Standard spectrum of DOP