

The Analysis of Synthetic Fibers by ionRocket-DART[®]-MS

【Keyword】 Synthetic fibers, ionRocket, DART[®]

【Subject area】 Chemical industry, Forensic Science, Identification, Foreign material analysis

■ Abstract

In order to analyze condensation polymers containing ester linkages such as polyester fiber, we usually use reaction pyrolysis GC / MS analysis which requires a methylating agent to suppress thermal decomposition products. In this application, we used ionRocket DART[®]-MS to analyze polyester fibers without the use of a methylating agent. Instead, ionRocket allows the direct detection of molecular ions derived from the repeating structure of the polymer. ionRocket DART[®]-MS can directly identify types of polyester fiber without the addition of a derivatization agent.

■ Sample

Polyester fibers (polyethylene-terephthalate: PET, polytrimethylene-terephthalate: PTT)

■ Method

Polyester fibers were cut to 10 mm length and then placed into the ionRocket copper sample pot. A temperature gradient of 100 °C /min. from room temperature to 600 °C was applied, total run time was 7 min.

■ Result

TIC are shown in Figure 1. MS spectra measured at 450 °C are shown in Figure 2.

In Figure 2, most detected peaks are due to species related by an interval of 192 and derived from the repeat structure of PET and species related by an interval of 206 derived from the repeat structure of PTT. DART[®]-MS is thus able to quickly distinguish between PET and PTT fibers.

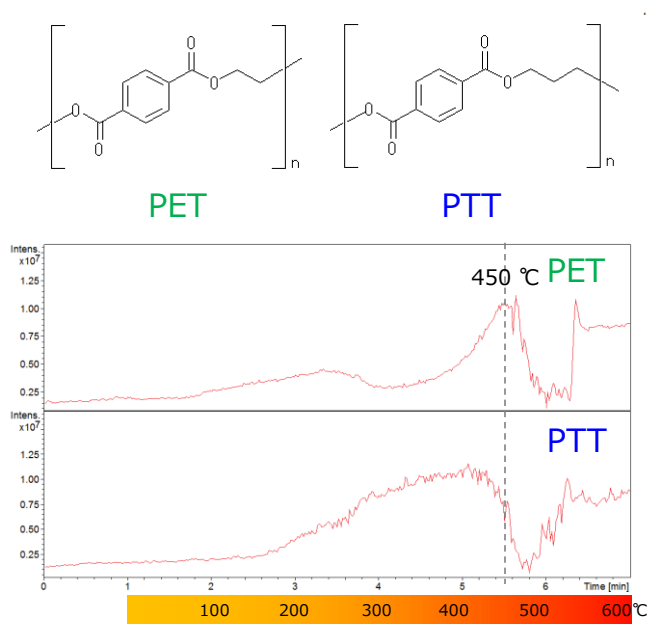


Figure 1. TIC of polyester fibers
R.T.→100 °C /min→600 °C

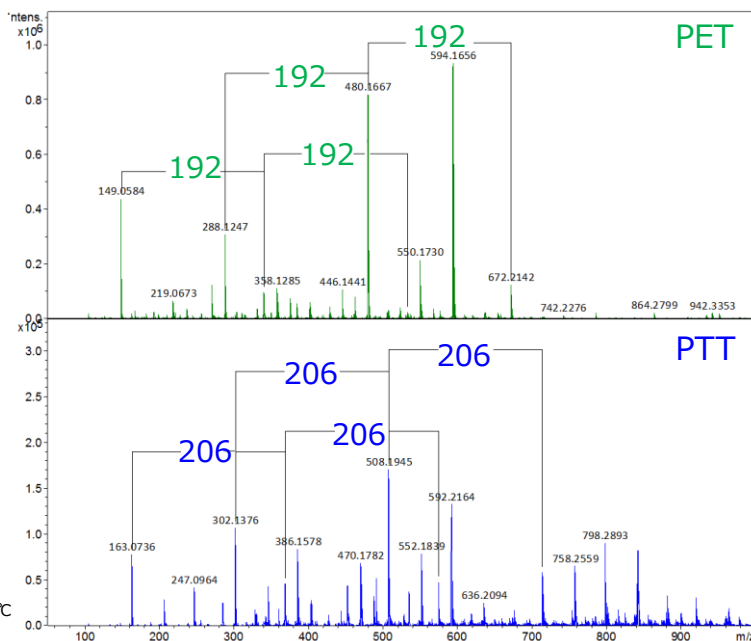


Figure 2. MS spectra measured at 450 °C
The preset temperature of DART[®]-SVP was 400 °C, DART(+)