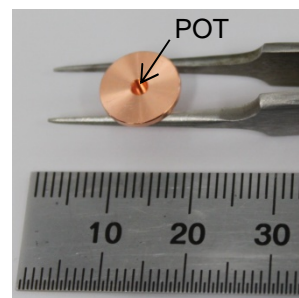# The Quick Discrimination of Nylon by ionRocket-DART-MS

Background   The nylon is general term of synthetic polymer, aliphatic polyamide. It is one of the most popular polymers. The nylon is widely diffused due to its high rigidity and elasticity. Nylon-6,10 and nylon-6,12 were similar tendency in FT-IR spectrum. In addition, these melting temperatures measured by DSC were also approximately 220 °C. Then the discrimination of them is difficult.

POT

Samples   Nylon-6,10 and nylon-6,12 (e.g. toothbrush)

Methods   The analysis tool was constructed with DART-MS (directed analysis in real time -mass spectrometry) and ionRocket, heating system. ionRocket was connected to DART-MS. The small quantities of samples were put on the POT and analyzed. The temperature was increased 100 °C per minutes from 30 °C to 600 °C.

Results   TIC was shown in Fig 1. MS spectra of measured at 300 °C were shown in Fig 2. From Fig.2, their monomers and dimers were mainly observed. In order to distinguish between nylon-6,12 and nylon-6,10, comparison of DART-MS spectra was meaningful.

nylon-6 12

nylon-6 10

nylon-6,12

300

nylon-6,12

311.26
Monomer
Proton adduct

621.52
Dimer
Proton adduct

nylon-6,10

565.46
Dimer
Proton adduct

283.23
Monomer
Proton adduct

nylon-6,10

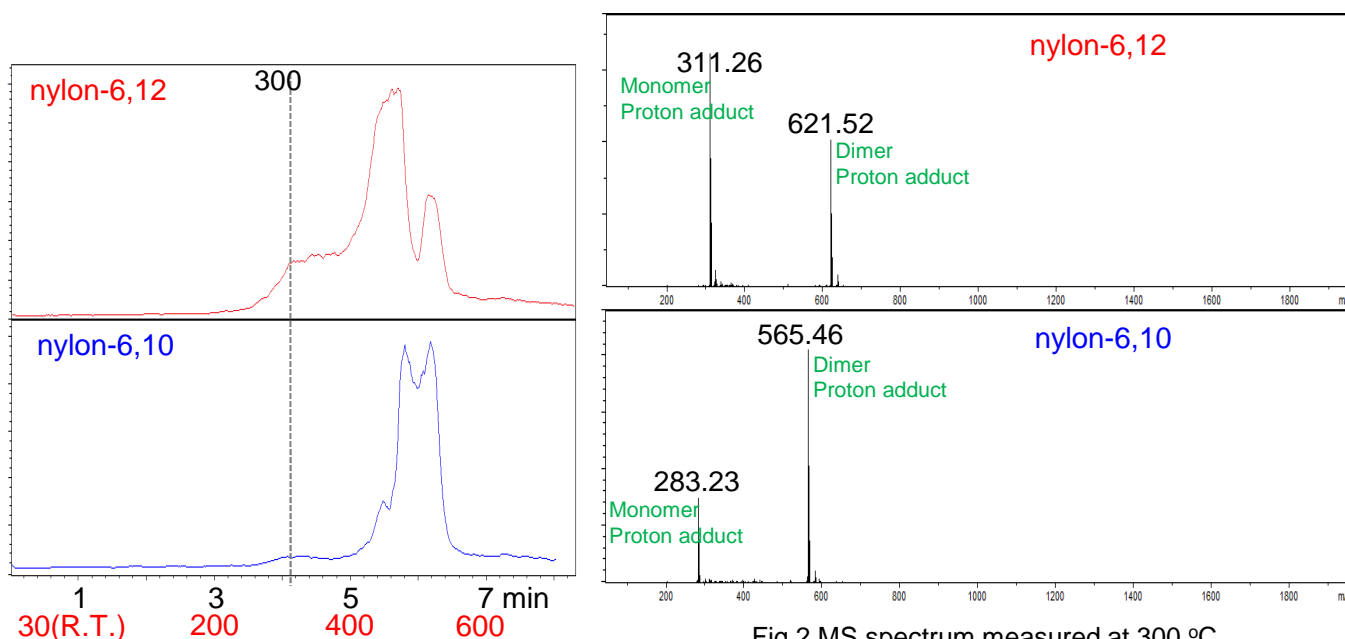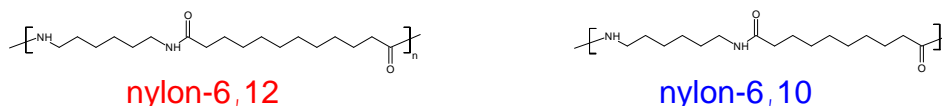1   30(R.T.)   3   200   5   400   7 min   600

Fig. 1 TIC of each sample.
R.T.→100°C/min→600°C

Fig.2 MS spectrum measured at 300 °C.
The preset temperature of DART-SVP was 400 °C
Ionization was DART positive.

Keyword   DART-MS, Nylon, Polyamide

Target   Material development, Chemical industry, Foreign material analysis