

Thermal Desorption and Pyrolysis for DART[®]-MS

ionRocket

**Industrial
Materials**

**Food
Safety**

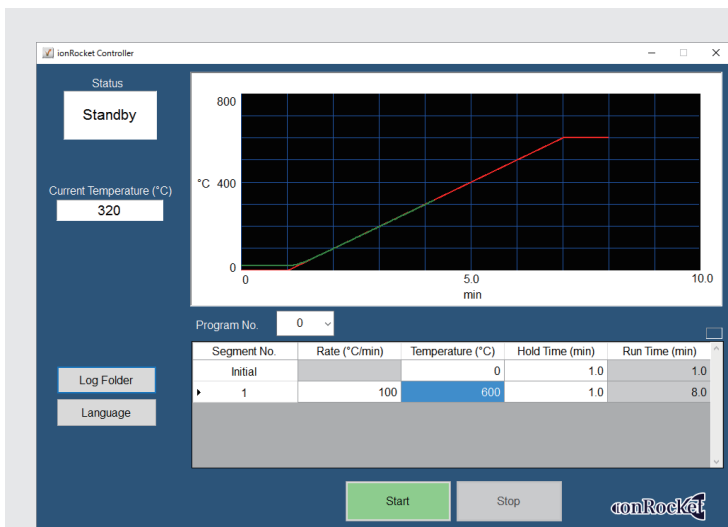
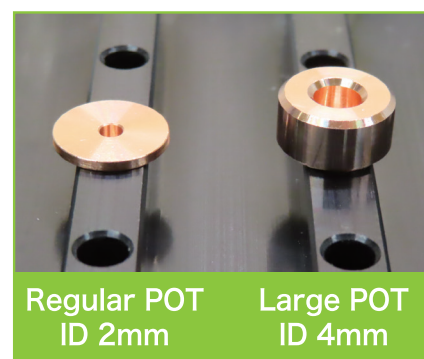
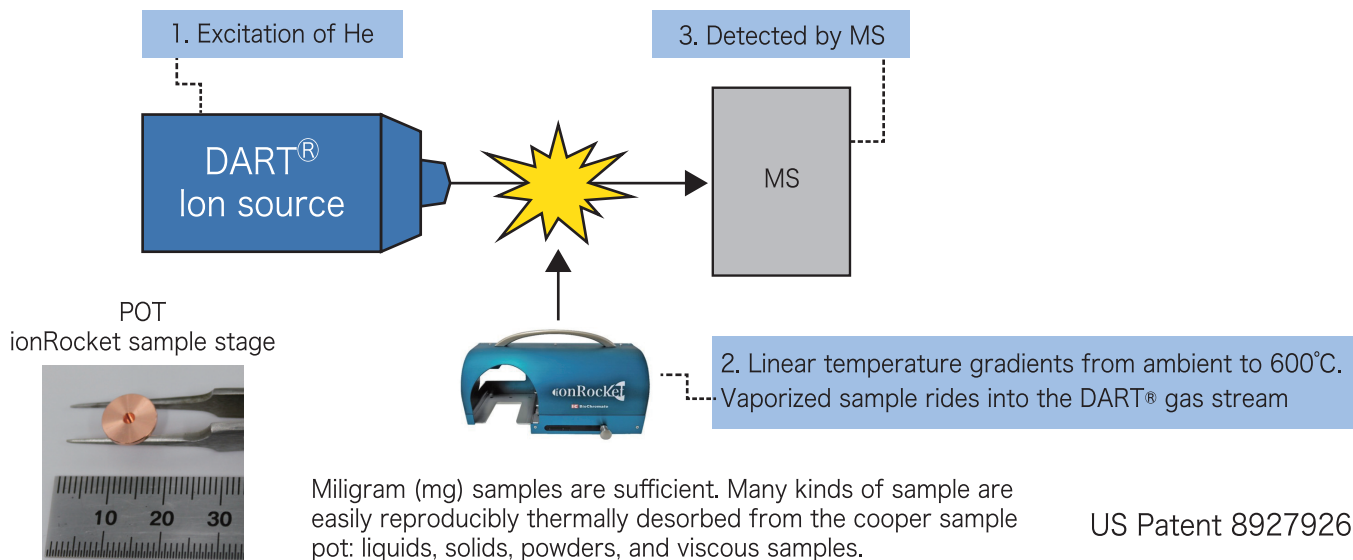


Cosmetics

Forensics

- Connect to DART® -MS and Visualize Hidden Compounds
- Temperature Gradient System Visualizes Compounds in Real Time
- Eliminates Sample Preparation Steps
- Great for Polymer Analysis

ionRocket DART® -MS System



ionRocket generates a temperature gradient from ambient up to as high as 600°C over several minutes.

This allows compounds in your samples to be sublimated, vaporized, or pyrolyzed according to their volatility, and then introduced into the DART® gas stream.

Analysis of polyethylene terephthalate (PET)

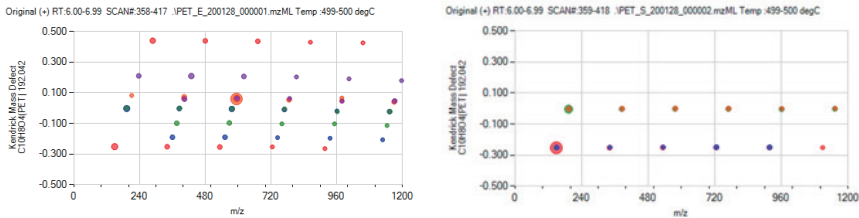


Fig.1 Bubble plots (500°C) of repeating unit in PET A and B

Purpose

Analysis of polyethylene terephthalate (PET) used in PET bottles using a time-of-flight mass spectrometer as a detector

Experiment

MS measurement of small pieces of PET bottles (A, B) using the ionRocket while raising the temperature from room temperature to 500°C (A; hard PET B; soft PET)

Analysis method

Using Spectra Scope and Data Analysis software, PET repeating structures were extracted from mass spectra, and A and B PET were compared.

Results

Fig.1 shows the analysis results (bubble plot) of the Polymer Engine. It was found that A had more PET repeating structures ($C_{10}H_8O_4$) than B.

Fig.2 shows the TIC and mass spectra. B was found to be more thermally decomposed than A. These results seem to indicate differences in the degree of polymerization and hardness of PET. It could be detected without pretreatment that the difference in the degree of polymerization and the characteristics of PET from PET bottles insoluble in general solvents.

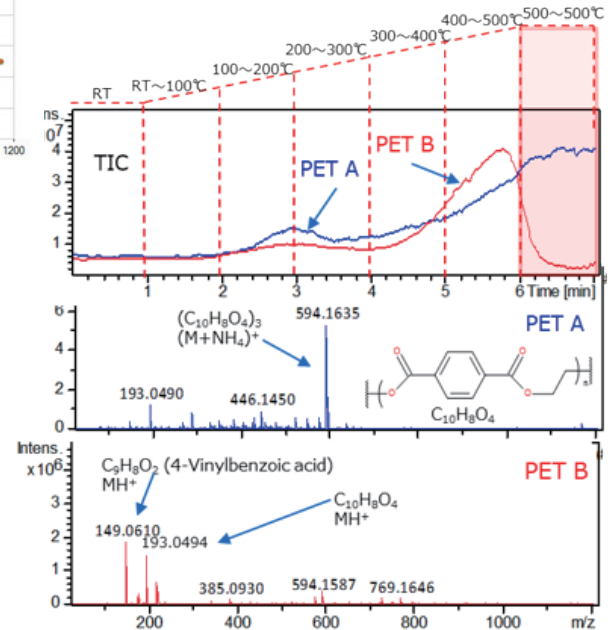


Fig.2 TIC and mass spectra of PET A and B (500°C)

Comparison analysis of laser printer prints

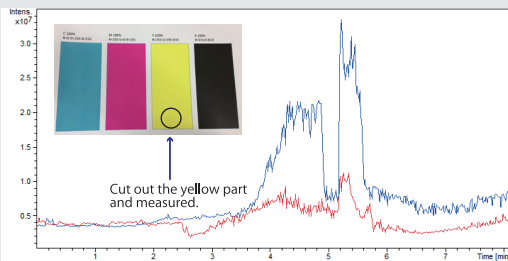


Fig.1 TIC of printed yellow part on paper

RT	m/z	Intensity	Reference Area	Sample Area	IDS Score	Compound Result
4.01-4.99	123.068	93422	31016	395226	92.2	3
5.01-5.99	111.0437	60621	71332	345842	79.4	3
5.01-5.99	175.1114	100192	13414	542622	97.5	2
4.01-4.99	135.0797	80899	23466	216252	89.1	2
5.01-5.99	109.0283	288519	228262	1290588	82.3	2
3.01-3.99	355.2841	151822	4430	529826	99.2	1
4.01-4.99	265.0633	50344	2448	138770	98.2	1
3.01-3.99	387.1271	246400	582	2396232	100	1
5.01-5.99	163.0387	76784	99694	353756	71.8	1

Fig.2 IDS Result Table

Purpose

Using a time-of-flight mass spectrometer as a detector, comparative analysis was performed between the two models with the yellow part printed by a laser printer.

Experiment

A yellow color code was printed, cut out to a diameter of 3 mm, and two pieces were measured with ionRocket while raising the temperature from room temperature to 600 °C.

Analysis method

The differences between samples were examined using "IDS" * (Intelligent Data Subtraction) of "Spectra Scope". The composition of peaks with differences was analyzed, and the compounds were estimated by "Compound Search".

Results

Fig.1 shows the TIC of Sample A (red) and B (blue). When the difference analysis was performed using "IDS" of "Spectra Scope", differences were found in multiple compounds (Figs. 2, 3). Among the difference components, $m/z=387.1271$ was detected in the printed paper Sample B around 4 to 5 minutes (300 to 400 °C), and $C_{18}H_{18}N_4O_6$ seemed to be the most consistent by composition analysis. The compound was estimated as "Pigment Yellow 74" by "Compound Search". With ionRocket, printed materials can be directly measured without sample preparation, making it easy to perform difference analysis and compound estimation.

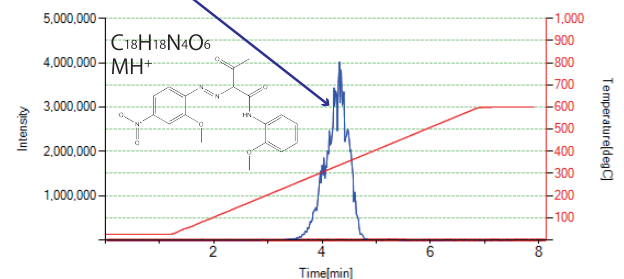


Fig.3 EIC of $m/z=387.1271$

Specifications

Main body



Heater control box



Heater control software



Regular POT
(50pc) included



Product name	ionRocket
Model number	MSIR04
Main body outer dimension/weight	W: 315 mm x D: 120 mm x H: 175 mm / 3.2 kg
Heater control box dimension/weight	W: 321 mm x D: 220 mm x H: 147 mm / 4.1 kg
Heating control temperature	Room temperature - 600°C
Main power	AC100V-240V, 50Hz/60 Hz
Operating temperature environment	10°C to 40°C (No condensation)
Power consumption	During operation: 320 W As stand-by: 32 W

* Note that the content and/or specifications described in this catalog may be subject to change without notice.

No.08

■ Manufacturer

BC **BioChromato**

BioChromato, Inc.

<https://www.bicr.biz/> E-mail: info@bicr.co.jp