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JEOL Solutions for Innovation

High Perfomance and all-round TOFMS

AccuTOF GCX

▷▶ High performance

Reliable determination of elemental composition

The high-resolution and high mass accuracy AccuTOF GCx enables accurate elemental composition determination, which is a powerful tool for the qualitative analysis of unknown compounds and impurities.

High-speed data acquisition

The AccuTOF GCx performs high throughput analysis using Fast GC with its high-speed data acquisition capability (50 spectra/s). It also supports GCxGC for ultrahigh separation analysis.

▷▶ All-round

A variety of ionization and sample introduction techniques

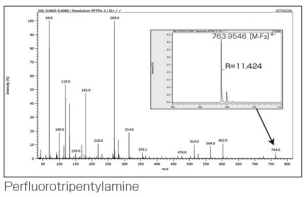
While electron ionization (EI) is effective in acquiring structural information, detection of molecular ions is critical in qualitative analysis of unknown compounds.

In addition to chemical ionization (CI), the AccuTOF GCx supports field ionization (FI) and field desorption (FD), which are powerful soft ionization techniques for molecular ion detection.

The system also supports direct sample inlets for analysis of high boiling point compounds and rapid analysis.

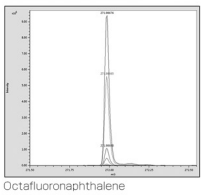
■ Elemental composition determination by accurate mass analysis

High resolution



Perfluorotripentylamine

High mass accuracy (at different concentrations, single ion)



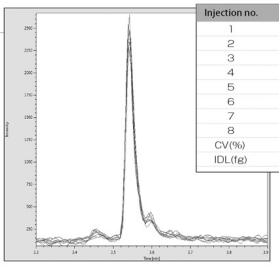
Octafluoronaphthalene

Injection volume [pg]	Error [mDa]
1: 0.1	0.26
2: 0.5	0.54
3: 1	0.34
4: 5	-0.56
5: 10	-0.04
6: 50	0.07
7: 100	0.21
8: 500	-0.02
9: 1000	0.08

■ High sensitivity

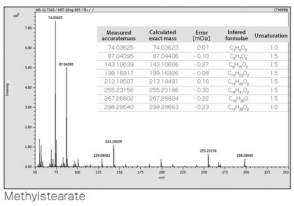
100fg CV=5.2%、IDL=16fg

100 fg of octafluoronaphthalene (OFN) was measured continuously 8 times. From the standard deviation of the EIC peak areas of OFN molecular ions, an instrument detection limit (IDL) of 16 fg was calculated.
CV: Coefficient of variation
IDL: Instrument detection limit



Injection no.	Peak area
1	65745
2	67212
3	58394
4	70698
5	65897
6	65604
7	65994
8	65230
CV(%)	5.2
IDL(fg)	16

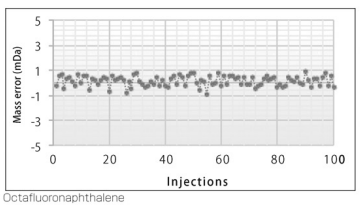
High mass accuracy (single component, multiple ions)



Measured accuratemass	Calculated exact mass	Error [mDa]	Infered formulae	Unsaturation
74.09525	74.09523	0.01	$C_4H_{12}N$	1.0
87.04395	87.04408	-0.13	$C_3H_7O_2$	1.5
143.10639	143.10666	-0.27	$C_8H_{15}O_2$	1.5
199.16917	199.16928	-0.09	$C_{12}H_{23}O_2$	1.5
213.18507	213.18491	0.16	$C_{13}H_{25}O_2$	1.5
255.23156	255.23186	-0.30	$C_{16}H_{31}O_2$	1.5
267.29802	267.29564	0.22	$C_{17}H_{39}O$	1.5
298.28640	298.28663	-0.23	$C_{19}H_{38}O_2$	1.0

Methylstearate

Stable mass accuracy over time

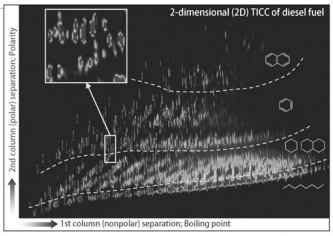


Octafluoronaphthalene

■ GCxGC analysis by ultrahigh speed data acquisition

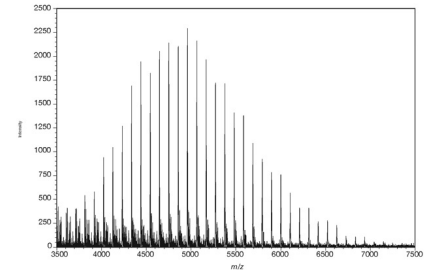
Accurate mass measurements are easily accomplished in GCxGC analysis, which requires ultrahigh speed data acquisition.
This is especially effective for nontargeted qualitative analysis of trace components.

Data acquired with ZOEX GCxGC system.
GCxGC chromatograms generated with 'GC Image' software (ZOEX.)



■ Wide mass range

Oligomer analysis with direct MS



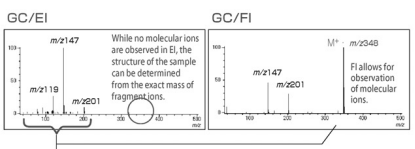
FD mass spectrum of polystyrene 5200

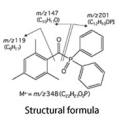
The AccuTOF GCx, with a wide mass range and direct inlet system, can analyze samples with large molecular weights that are difficult to handle with GC.

■ EI/FI/FD combination ion source (optional)

JEOL's unique ion source combining EI, FI, and FD ionization allows for GC/EI, GC/FI, and FD analysis without changing the ion source. The single ion source supports highly productive analysis without breaking the vacuum.

· Qualitative analysis combining EI and FI

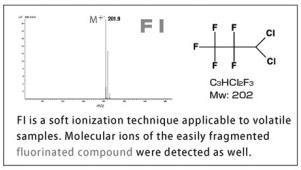




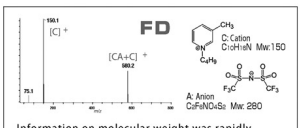
Structural formula

The EI mass spectrum allows for library search. The elemental composition of fragment ions results in structural information. Meanwhile, molecular ions detected in FI suggest the molecular weight and elemental composition. By combining the information resulting from EI and FI, one can achieve highly accurate qualitative analysis without relying solely on library search. The combined technique is effective in qualitative analysis of unknown components such as impurities.

· FI and FD

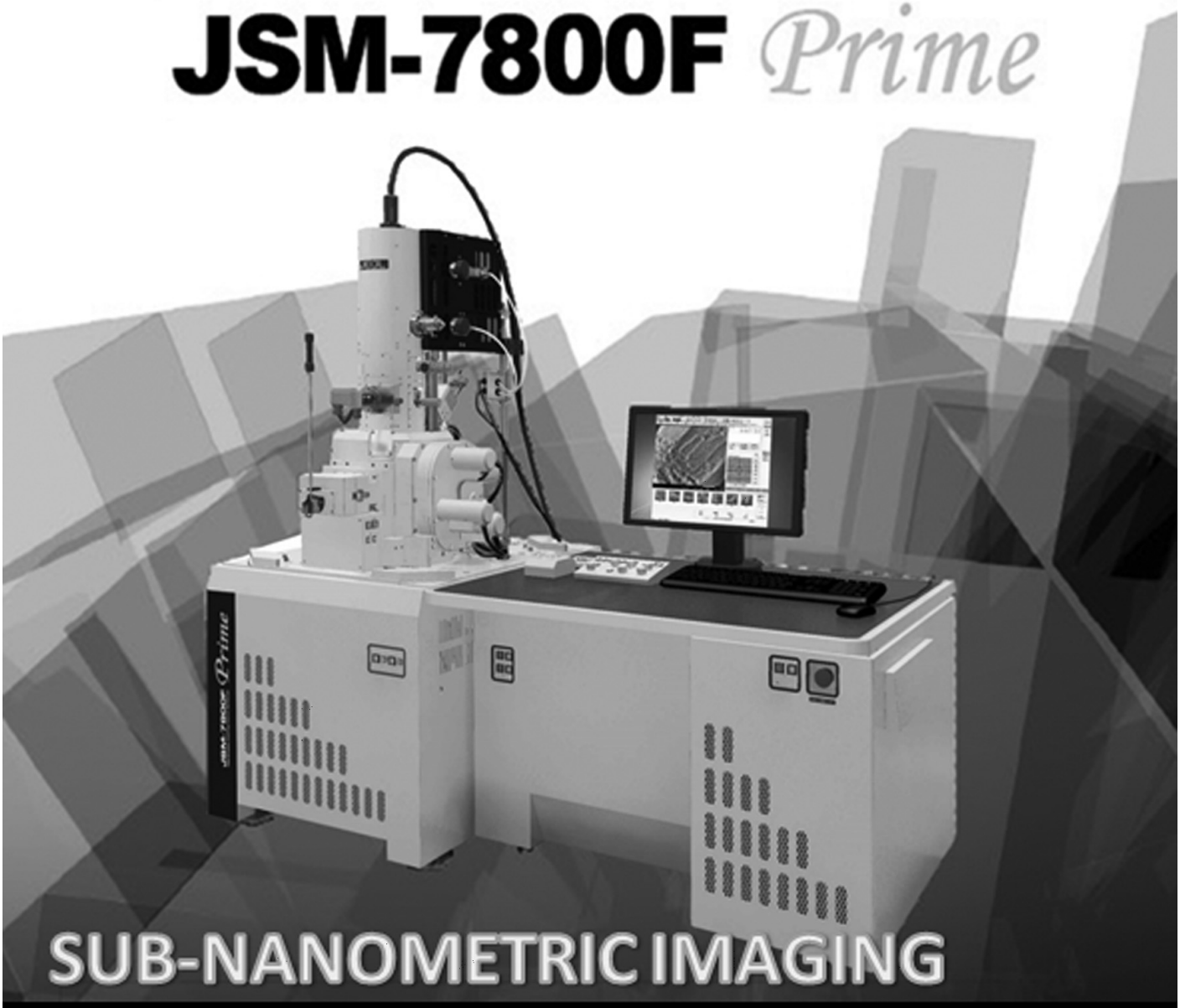


FI is a soft ionization technique applicable to volatile samples. Molecular ions of the easily fragmented fluorinated compound were detected as well.



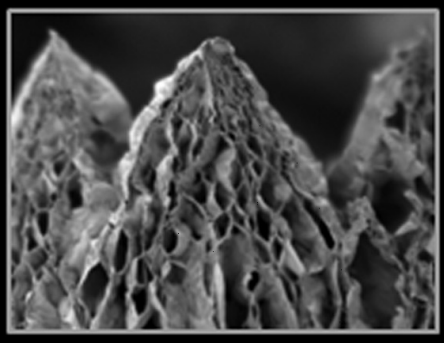
Information on molecular weight was rapidly acquired from nonvolatile ionic liquid.

JSM-7800F *Prime*

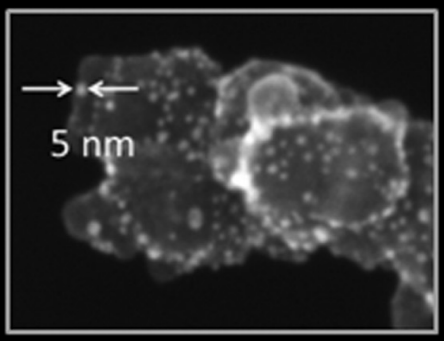


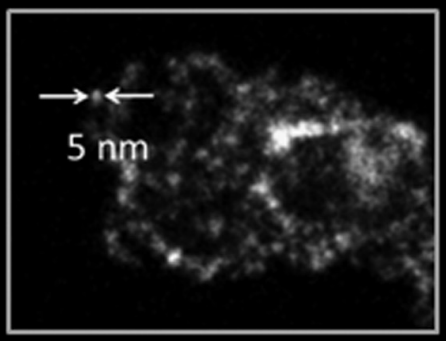
SUB-NANOMETRIC IMAGING & NANOMETRIC ANALYSIS

Resolution: 0.7nm from 30kV to 1kV



Graphene (80V)





EDS analysis of nanoparticles

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