JEOL MS Data Sheet

MS Tips

Mass Spectrometry Application Group
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Qualitative analysis by comprehensive 2D GC / TOFMS [1]
- Comparison of kerosene and diesel oil -

Comprehensive two-dimensional gas chromatography (GC x GC) is a kind of a continuous hard-cut GC system. Two different types of columns are connected via a modulator in the same GC oven. The GC x GC technique has a very high separating power compared to single GC. GC x GC systems requires a fast acquiring detection system, because the peak width in the GC chromatogram is very narrow. This requirement of very fast data acquisition is fully met in the AccuTOF-GC. Since the maximum spectrum recording interval on JEOL AccuTOF-GC is 25Hz (0.04sec), the system can successfully be used as detection system in combination with a GC x GC system.
This application note shows the results of kerosene and diesel oil by GC x GC-TOFMS.

<Sample and measurement conditions>

Sample kerosene and diesel oil

Measurement conditions

For GC×GC

System:	Agilent 6890GC
	ZOEX KT2004
Column:	1st: HP-1ms (30m × 0.25mm I.D., 0.25μm)
	2nd: DB-17 (2m × 0.1mm I.D., 0.1μm)
Oven temp.:	50C（1min）→ 5C/min → 280C（6min）
Injection temp.:	280C
Injection volume:	0.5μl [Split mode (1:200)]
Carrier gas:	He (Const. pressure: 680kPa)
Trapping interval:	6 sec

For MS

MS:	JMS-T100GC “AccuTOF GC”
Ionization method:	EI+（70eV, 300μA）
Acquired m/z range:	m/z 35－500
Spectrum recording interval:	0.04 sec (25Hz)

<Results and discussion>

All the chromatograms were created by using GC Image software (ZOEX). The GC x GC chromatograms of kerosene and diesel oil are shown on Fig.1. The X axis corresponds with the separation by the 1st column on differences in boiling point and the Y axis corresponds with the separation by the 2nd column of differences in polarity. Also, the color in the chromatograms show the

intensity of each peak. The intensity increases from light blue to yellow and red. Red color shows that the compound intensity is over the setting value of maximum intensity.

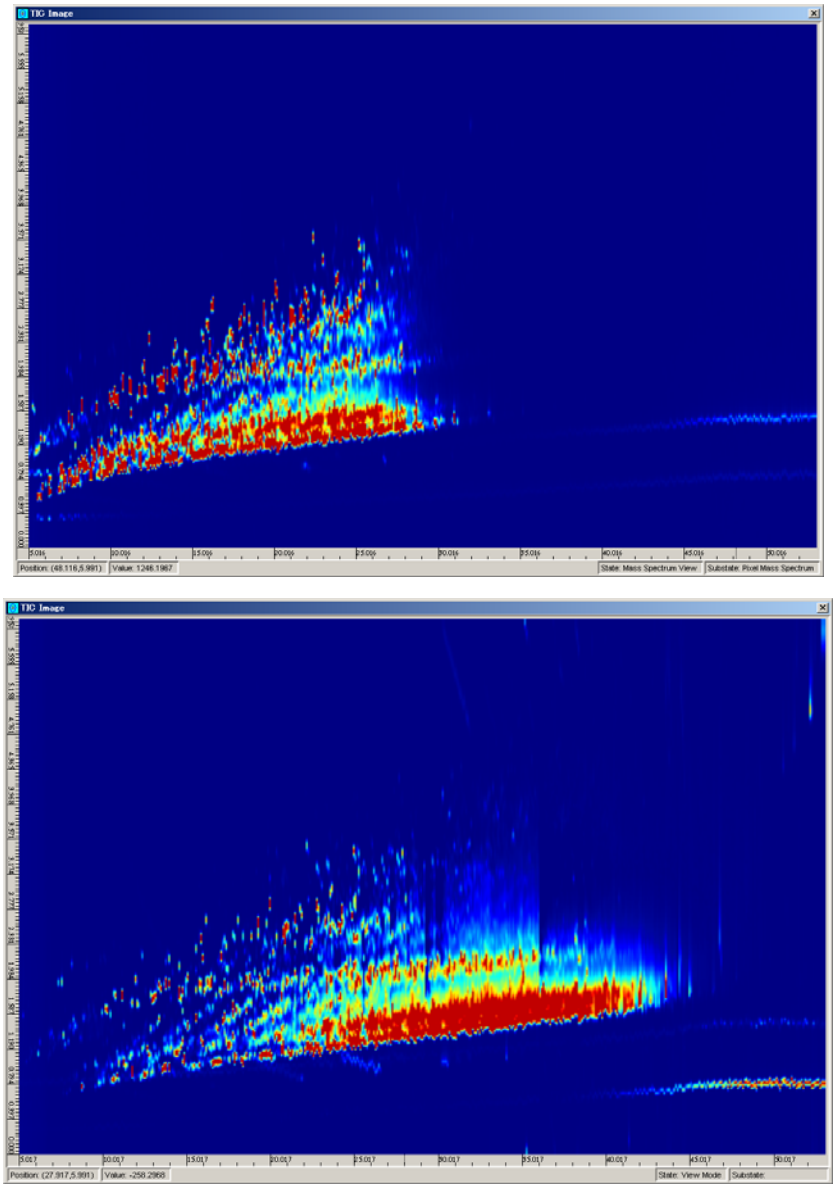

Fig.1 TICC by GC x GC (Top: kerosene, Bottom: diesel oil)

In general, kerosene is a mixture of C9 - C15 hydrocarbons and diesel oil is a mixture of C11 - C15 hydrocarbons. GC x GC chromatograms show that kerosene includes more low-boiling point compounds and diesel oil includes more high-boiling point compounds. In addition, GC x GC separates saturated hydrocarbons, unsaturated hydrocarbons, and aromatic hydrocarbons and so on by the difference of polarity.

The AccuTOF-GC has the capability of high speed spectrum recording to combine with GC x GC system. Furthermore, it is possible to have a good reliability with high sensitivity with high mass resolving power.

<Acknowledge>

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Zoex's GC x GC system is provided and supported through Zoex's sales and support network and may not be available in your territory. Contact your local JEOL representative for detail.