

Application Data Sheet

No.21

GCMS

Gas Chromatograph Mass Spectrometer

Analysis of Gasoline Using a GC-MS

Regular gasoline was analyzed utilizing a GC-MS. To minimize gasoline fuel consumption, the average boiling point is adjusted to about 100°C. In addition, as adjustment to the optimal boiling point depends on the air temperature, the composition will differ between summer and winter, and between cold areas like Hokkaido and hot areas like Okinawa.

Analysis Conditions

Table 1: Analysis Conditions

GC-MS	: GCMS-QP2010 Ultra		
[GC]		[MS]	
Vaporization chamber temperature:	250°C	Interface temperature	: 250°C
Column	: HP-PONA (50 mL. x 0.25 mmI.D., 0.50 µm)	Ion source temperature	: 200°C
Column oven temperature:	40°C (1min) →(2°C/ min)→150°C	Solvent elution time	: 0.50 min
Injection mode	: Split	Data sampling time	: 1 min to 50 min
Carrier gas	: Helium	Measurement mode	: Scan
Control mode	: Constant linear velocity (30.6 cm/sec)	Mass range	: <i>m/z</i> 35 to 500
Purge flow rate	: 5.0 mL/min	Event time	: 0.3 sec
Split ratio	: 250		
Injection quantity	: 1.0 µL		

Results

Fig. 1 shows the total ion current chromatogram for regular gasoline measured with a GC-MS. Table 1 shows the retention times for the compounds identified.

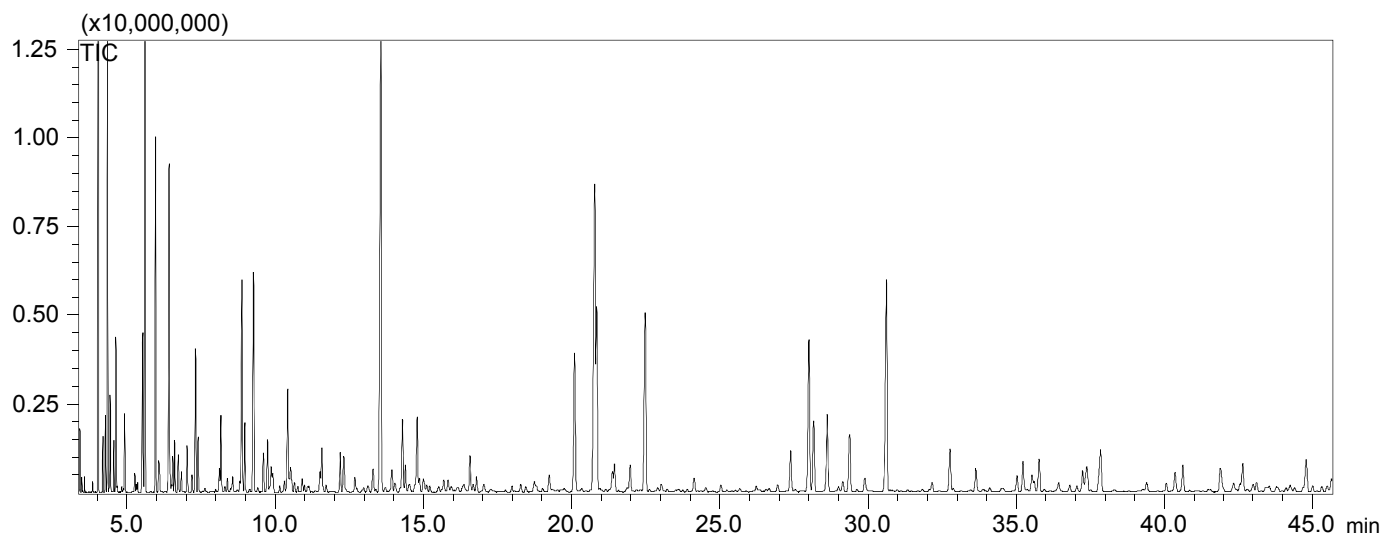


Fig. 1: Total Ion Current Chromatogram for Regular Gasoline

Table 1: List of Identification Results for Regular Gasoline

Retention time (mm)					
Retention Time	Compound Name	Retention Time	Compound Name	Retention Time	Compound Name
3.240	Isobutane	8.160	Benzene	16.560	n-octane
3.349	2-buten	8.382	3,3-dimethylpentane	19.239	2,5-dimethylheptane
3.412	n-butane	8.563	Cyclohexane	20.084	Ethylbenzene
3.467	trans-2-buten	8.533	cis-2-methyl-3-hexene	20.737	m-xylene
3.564	cis-2-buten	8.708	4-methyl-1-hexene	20.816	p-xylene
3.834	3-methyl-1-buten	8.800	4-methyl-2-hexene	21.376	4-methyloctane
4.020	Isopentane	8.864	2-methylhexane	21.452	2-methyloctane
4.180	1-pentene	8.968	2,3-dimethylpentane	21.973	3-methyloctane
4.265	2-methyl-1-buten	9.129	Cyclohexene	22.487	o-xylene
4.329	n-pentane	9.257	3-methylhexane	24.130	n-nonane
4.429	trans-2-pentene	9.598	trans-1,3-dimethylcyclopentane	27.388	n-propylbenzene
4.548	cis-2-pentene	9.731	cis-1,3-dimethylcyclopentane	28.031	m-ethyltoluene
4.625	2-methyl-2-buten	10.144	cis-3-methyl-3-hexene	28.189	p-ethyltoluene
4.911	2,2-dimethylbutane	10.297	trans-3-heptene	28.641	1,3,5-trimethylbenzene
5.259	Cyclopentene	10.410	n-heptane	29.147	4-methylnonane
5.304	4-methyl-1-pentene	10.538	2-methyl-2-hexene	29.398	o-ethyltoluene
5.345	3-methyl-1-pentene	10.561	cis-3-methyl-2-hexene	29.889	3-methylnonane
5.503	cyclopentane	10.644	trans-2-heptene	30.623	1,2,4-trimethylbenzene
5.518	2,3-dimethylbutane	10.754	3-ethyl-2-pentene	32.167	n-decane
5.597	2-methylpentane	10.903	trans-3-methyl-2-hexene	32.770	1,2,3-trimethylbenzene
5.953	3-methylpentane	11.086	cis-2-heptene	33.640	Indan
6.070	2-methyl-1-pentene	11.501	1,2-dimethylcyclopentane	35.017	1,3-diethylbenzene
6.101	1-hexene	11.564	Methylcyclohexane	35.238	1-methyl-3-propylbenzene
6.407	n-hexane	12.186	2,5-dimethylhexane	35.535	1-methyl-4-propylbenzene
6.452	trans-3-hexene	12.309	2,4-dimethylhexane	35.768	1,3-dimethyl-5-ethylbenzene
6.492	cis-3-hexene	12.685	1,2,4-trimethylcyclopentane	36.440	Methyldecane
6.534	trans-2-hexene	13.394	3-ethylcyclopentane	37.034	Methyldecane
6.604	2-methyl-2-pentene	13.563	Toluene	37.244	1,4-dimethyl-2-ethylbenzene
6.719	cis-3-methyl-2-pentene	13.935	2,3-dimethylhexane	37.381	1,2-dimethyl-4-ethylbenzene
6.831	cis-2-hexene	14.039	2-ethyl-3-methyl-1-pentene	40.061	n-undecane
7.024	trans-3-methyl-2-pentene	14.212	1-methylcyclohexane	40.354	1,2,4,5-tetramethylbenzene
7.193	2,2-dimethylpentane	14.286	2-methylheptane	40.626	1,2,3,5-tetramethylbenzene
7.301	Methylcyclopentane	14.387	4-methylheptane	41.875	5-Methylindan
7.390	2,4-dimethylpentane	14.782	3-methylheptane	42.643	2-Methylindan
7.623	2,2,3-methylbutan	15.681	1-ethyl-3-methylcyclopentane	44.788	Naphthalene
7.988	2,4-dimethyl-1-pentene	15.839	1-ethyl-3-methylcyclopentane		
8.113	1-methylcyclopentane	16.432	4-octene		

