SHIMADZU APPLICATION NEWS

LA146-E016

● GASCHROMATOGRAPHY MASS SPECTROMETRY

No.M193

Analysis of Volatile Organic Compounds using GC/MS

In this Application Note, the 21 volatile compounds were measured using the Purge & Trap method. Among the target compounds, chloroethane, vinyl chloride, chloromethane, and 1,3-butadiene exist as gases at room temperature. They were dissolved into chilled methanol to prepare the standard samples. The peaks of chloromethane, vinyl chloride, bromomethane and 1,3-butadiene are overlapped with the peaks of methanol or water, causing baseline fluctuations. Thus special care is needed when deciding the analytical conditions.

Table 1 shows the analytical conditions and Table 2 shows the list of the target substances. Fig. 1 shows the TIC for the 20 substances in Table 2 and other volatile compounds of EPA624. Peaks for the 20 substances in Table 2 are marked with corresponding numbers.

Table 1 Analytical Conditions

-GC-			
Column	: Aquatic 60m×0.25mm I.D. df=1.0µm		
Column Temp.	: 40˚C(5min)-7˚C/min -220˚C(5min)		
Injector Temp.	: 220˚C		
Carrier Gas	: He 100kPa		
-MS-			
Scan range	: m/z 29 → 300		
SIM	: 0.2sec		
-P&T-			
Trap	: GL-TRAP 1		
Line Temp.	: 180˚C		
Valve Temp.	: 180˚C		
Mount Temp.	: 60˚C		
Purge Temp.	: 35˚C		
Purge Time	: 2.5min		
Purge Flow	: 30mL/min	Desorb Time	: 3min
Drypurge Time	: 0min	Desorb Temp.	: 200˚C
Cryo focus Temp.	: -190˚C	Bake Time	: 20min
Cryo Inj. Temp.	: 200˚C	Bake Temp.	: 200˚C

Table 2 List of VOCs

Peak No.	Compound	SIM	
1	Chloromethane	50.00	52.00
2	Vinyl chloride	64.00	62.00
3	1,3-Butadiene	54.00	39.00
4	Bromomethane	94.00	96.00
5	Chloroethane	64.00	66.00
6	Allyl chloride	78.00	76.00
7	Cycropentane	55.00	70.00
8	Methyl-t-butylether	57.00	73.00
9	n-Hexane	86.00	57.00
10	2-Bromopropane	122.00	124.00
11	1,1-Dichloroethane	83.00	63.00
12	1-Bromopropane	122.00	124.00
13	Bromochloromethane	130.00	128.00
14	Bromodichloromethane	83.00	85.00
15	Dibromochloromethane	129.00	127.00
16	Chlorobenzene	112.00	77.00
17	1,1,1,2-Tetrachloroethane	131.00	117.00
18	Ethylbenzene	106.00	91.00
19	1,1,2,2-Tetrachloroethane	83.00	85.00
20	1,2,3-Trichloropropane	110.00	75.00

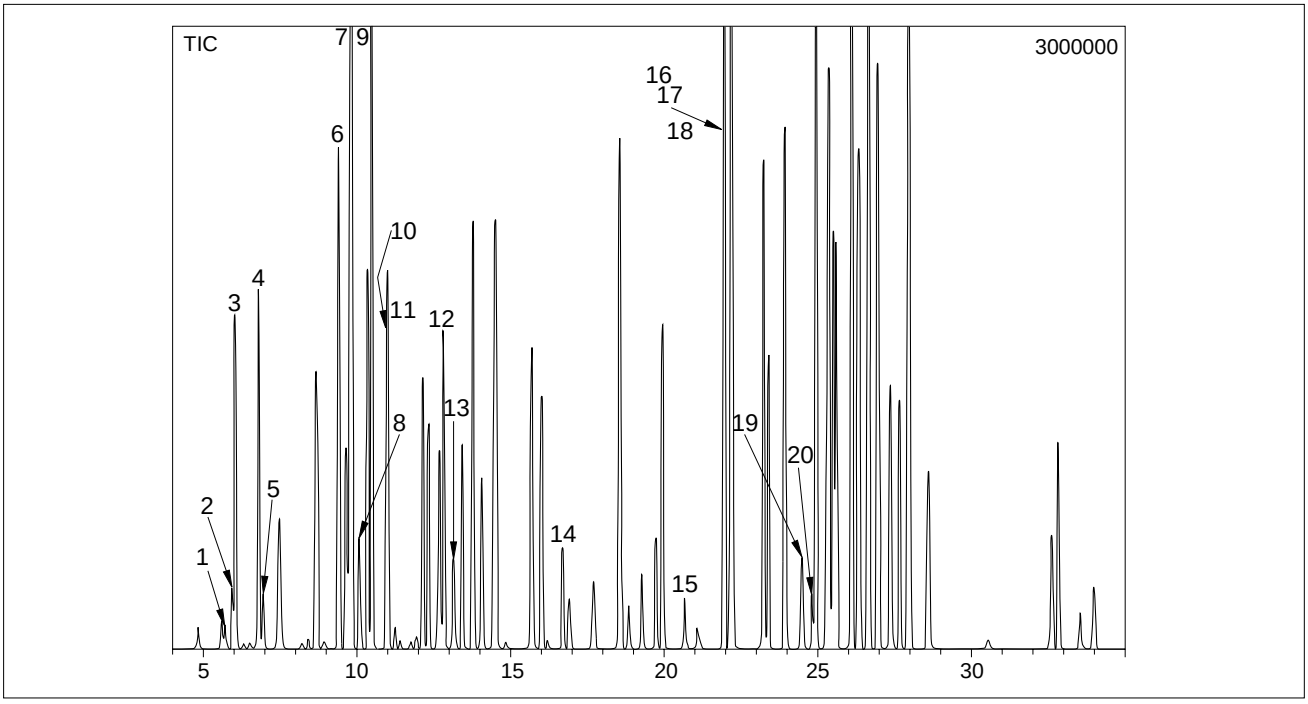

Fig. 1 TIC of VOCs

Fig. 2 through 21 show the SIM chromatograms for each substance at a concentration of 10 ppt.

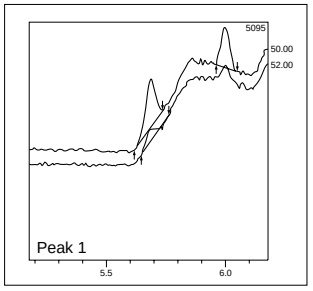

Fig.2 SIM of chloromethane (10ng/L)

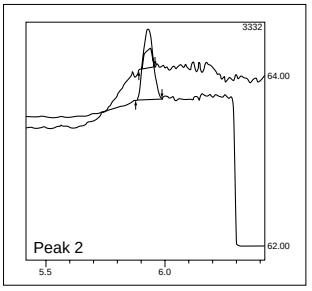

Fig.3 SIM of vinyl chloride (10ng/L)

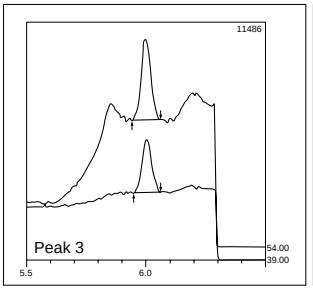

Fig.4 SIM of 1,3-butadiene (10ng/L)

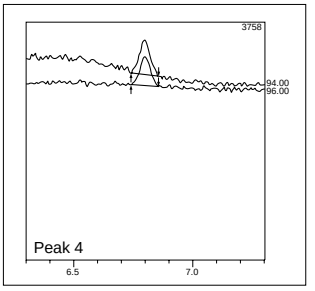

Fig.5 SIM of bromomethane (10ng/L)

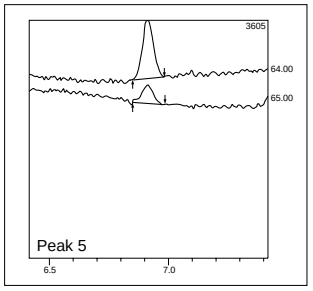

Fig.6 SIM of chloroethane (10ng/L)

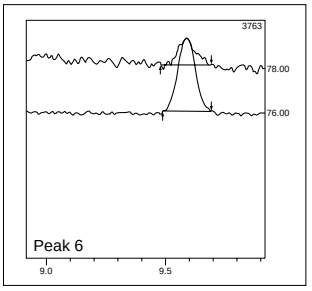

Fig.7 SIM of allyl chloride (10ng/L)

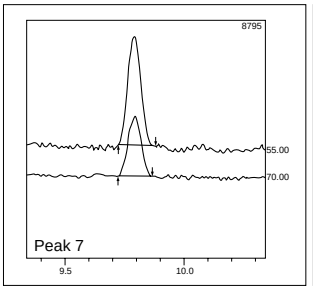

Fig.8 SIM of cycropentane (10ng/L)

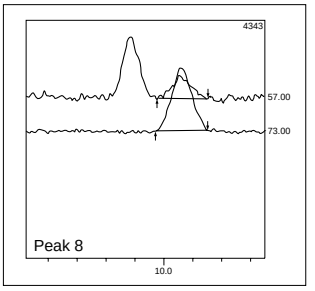

Fig.9 SIM of methyl-t-butylether (10ng/L)

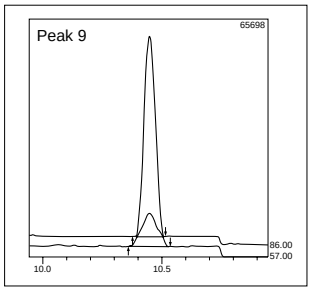

Fig.10 SIM of n-hexane (10ng/L)

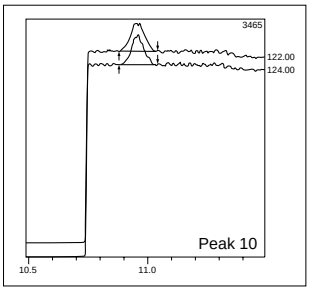

Fig.11 SIM of 2-bromopropane (10ng/L)

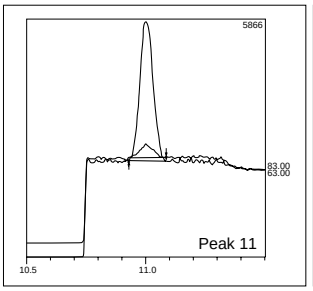

Fig.12 SIM of 1,1-dichloroethane (10ng/L)

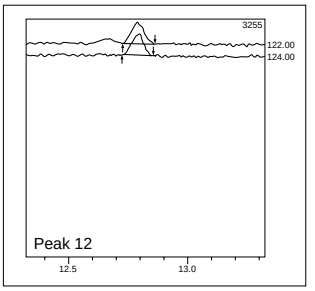

Fig.13 SIM of 1-bromopropane (10ng/L)

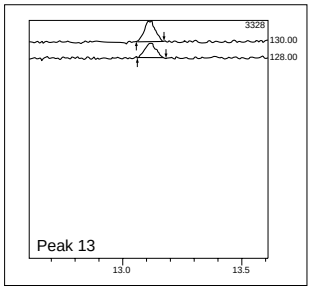

Fig.14 SIM of bromochloromethane (10ng/L)

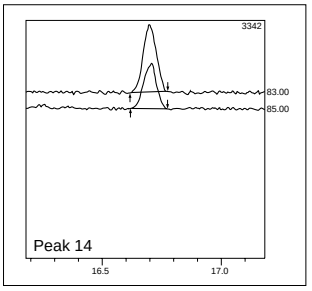

Fig.15 SIM of bromodichloromethane (10ng/L)

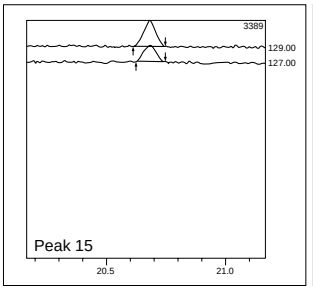

Fig.16 SIM of dibromochloromethane (10ng/L)

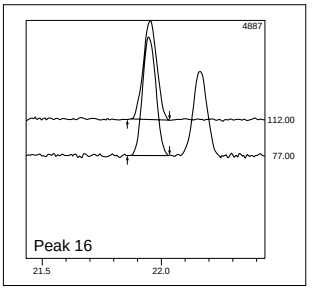

Fig.17 SIM of chlorobenzene (10ng/L)

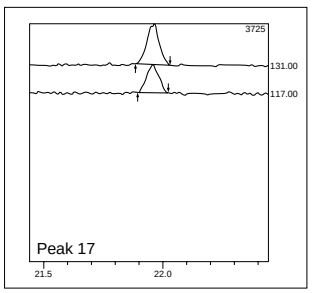

Fig.18 SIM of 1,1,1,2-tetrachloroethane (10ng/L)

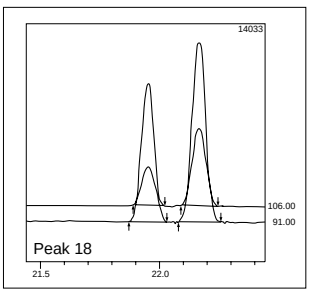

Fig.19 SIM of ethylbenzene (10ng/L)

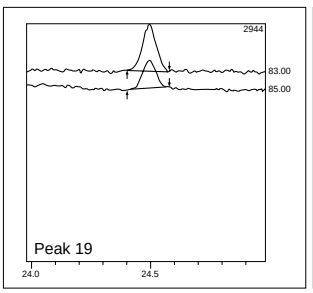

Fig.20 SIM of 1,1,2,2-tetrachloroethane (10ng/L)

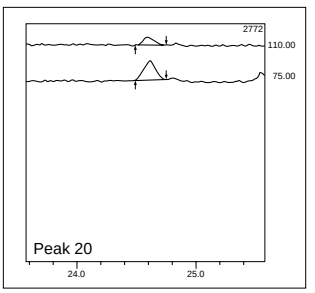

Fig.21 SIM of 1,2,3-trichloropropane (10ng/L)

SHIMADZU

SHIMADZU CORPORATION. International Marketing Division

3. Kanda-Nishikicho 1-chome, Chiyoda-ku, Tokyo 101-8448, Japan Phone: 81(3)3219-5641 Fax. 81(3)3219-5710
Cable Add.:SHIMADZU TOKYO

Printed in Japan 3100-02421-10A-IK