

Application News

Gas Chromatograph

Analysis of VOC in Water using Nexis GC-2030 and Headspace Sampler HS-10

No. **G293A**

Volatile Organic Compound (VOC) is a collective term used to describe organic compounds that can be easily vaporized. Some well known examples include: toluene, benzene, and dichloromethane. In recent years, amid mounting concerns over health and air pollution, strict regulations concerning the emission and examination of VOCs have been implemented.

This Application News describes the analysis of volatile organic compounds (VOCs) in water using Nexis GC-2030 equipped with ECD-2010 Exceed and headspace sampler HS-10.

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Instruments Used

Table 1 Instruments

GC	: Nexis GC-2030
Headspace Sampler	: HS-10
Detector	: ECD-2010 Exceed
Software	 LahSolutionsGC

*Inert Liner 1.2 mm: P/N 221-76863-73



Fig. 1 Nexis GC-2030 and HS-10

Analytical Conditions

10~mL of mixed standard solution adjusted to $10~\mu\text{g/L}$ of each component and 3~g of sodium chloride were enclosed in a 20~mL volume headspace vial and measured under the following conditions.

Table 2 Nexis GC-2030 Conditions

Column	: SH-I-624Sil MS
	$(0.32 \text{ mm I.D.} \times 60 \text{ m, d.f.} = 1.8 \mu\text{m})^{*1}$
Column Temp.	: 40 °C (5 min) − 4 °C /min − 80 °C (0 min)
	– 10 °C /min – 250 °C (3 min)
Carrier Gas	: He, 35 cm/sec (Constant Linear Velocity Mode)
Inj. Temp.	: 170 ℃
Inj. Method	: Split (1:10)
Purge Flow	: 3.0 mL/min
Det. Temp.	: 300 ℃

^{*1} P/N: 221-75963-60

Table 3 HS-10 Conditions

: 60 ℃
: 150 ℃
: 160 °C
: 100 kPa
: Level 3
: 60 min
: 0 min
: 0 min
: 1.6 min
: 0.1 min
: 0.2 min
: 0.1 min
: 1 min
: 60 min

1: 1,1Dichloroethylene 8: 1,2-Dichloroethane
2: Dichloromethane 9: Trichloroethylene
3: trans-1,2-Dichloroethylene 10: 1,2-Dichloropropane
4: cis-1,2-Dichloroethylene 11: Bromodichloromethane
5: Chloroform 12: cis-1,3-Dichloropropene
6: 1,1,1-Trichloroethane 13: trans-1,3-Dichloropropene
7: Carbon tetrachloride 14: 1,1,2-Trichloroethane

15: Tetrachloroethylene16: Dibromochloromethane

17: Bromoform

18: p-Dichlorobenzene

Results

Fig.1 shows the chromatogram of standard solution (each component 10 µg/L). Table 4 indicates repeatability of the peak area in five time continuous analysis. Good sensitivity and reproducibility were obtained.

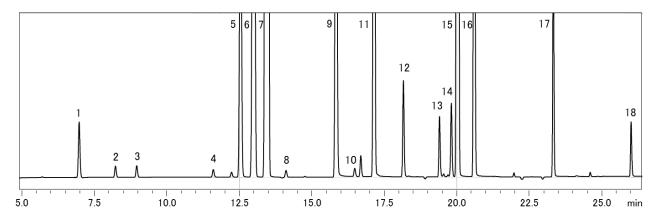


Fig. 2 Chromatogram of standard solution (each component 10 μg/L)

Table 4 Repeatability of the peak area of standard solution (n=5)

	Area	RSD(%)
1,1Dichloroethylene	51868	1.27
Dichloromethane	12379	1.74
trans-1,2-Dichloroethylene	11007	2.00
cis-1,2-Dichloroethylene	7850	2.63
Chloroform	500926	1.56
1, 1, 1-Trichloroethane	1239853	1.35
Carbon tetrachloride	2852152	1.27
1,2-Dichloroethane	7213	1.93
Trichloroethylene	725831	1.54

	Area	RSD(%)
1,1Dichloropropane	8633	2.21
Bromodichloromethane	1315361	1.86
cis-1,3-Dichloropropene	96110	2.19
trans-1,3-Dichloropropene	56857	2.34
1,1,2-Trichloroethane	75434	1.81
Tetrachloroethylene	2135446	1.59
Dibromochloromethane	701019	2.01
Bromoform	205394	1.88
p-Dichlorobenzene	53132	1.81

Note: The above stated values are reference values only. Values may vary depending on the environment and analytical procedure.



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