

HJ 583—2010

代替 GB/T 14677—93

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# 环境空气 苯系物的测定

## 固体吸附/热脱附-气相色谱法

**Ambient air—Determination of benzene and its analogies using sorbent  
adsorption thermal desorption and Gas Chromatography**

2010-9-20 发布

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# 前 言

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GB/T 14677 93

1993

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1993 9 18

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2010 9 20

2010 12 1

# 环境空气 苯系物的测定

## 固体吸附/热脱附-气相色谱法

### 1 适用范围

/ -

1 L

1

表 1 方法检出限和测定下限

mg/m <sup>3</sup>				
	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$
	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$	$1.0 \times 10^{-3}$	$4.0 \times 10^{-3}$
	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$	$1.0 \times 10^{-3}$	$4.0 \times 10^{-3}$
	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$	$1.0 \times 10^{-3}$	$4.0 \times 10^{-3}$
	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$	$1.0 \times 10^{-3}$	$4.0 \times 10^{-3}$
	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$	$1.0 \times 10^{-3}$	$4.0 \times 10^{-3}$
	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$	$1.0 \times 10^{-3}$	$4.0 \times 10^{-3}$
	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$	$1.0 \times 10^{-3}$	$4.0 \times 10^{-3}$

### 2 方法原理

2 6

Tenax

FID

### 3 试剂和材料

#### 3.1

3.2

3.1

3.3

99.999

3.4

99.99

3.5

#### 4 仪器和设备

4.1

FID

4.2

4.2.1

2 m

3 mm

4 mm

2.5

DNP

2.5

- 34 bentane

Chromsorb G·DMCS

80

100 )

A

4.2.2

PEG-20M

30 m × 0.32 mm × 1.00 μm

4.3

300

100

4.4

200

400

4.5

0.01 L/min

0.1 L/min

0.1 L/min

0.5 L/min

4.6

200 mg

Tenax 60

80

15 mm

4.7

0.1

4.8 0.01 kPa

4.9 1  $\mu$ l 5  $\mu$ l

4.10

## 5 样品

5.1

50 ml/min

350

120 min

350

30 min

4

5.2

5.2.1

5.2.2

10 ml/min 200 ml/min

10 min 20

min

20

200 mg Tenax-TA

B

5.2.3

5.3

4

30 d

5.4

## 6 分析步骤

6.1

6.1.1

6.1.2

2.0 ml/min

0.25 mm

2.0 ml/min                      0.32 mm  
 1.0 μm                              4.2.2  
 6. 2  
 6. 2. 1  
 6. 2. 1. 1  
     50 ml/min                      100                              150                              250  
     3 min  
 6. 2. 1. 2  
     50 ml/min                              150                              150                              65  
     40 ml/min                              400 ml/min  
 6. 2. 2  
 6. 2. 2. 1  
     40                                      40                                      40                                      2 min  
     250                                      3 min                                      30 ml/min  
     250                                      3 min                                      150  
 6. 2. 2. 2  
     80                                      3.0 m/min                                      150                                      250  
     30 ml/min                                      40 ml/min                                      400 ml/min  
 6. 3  
 6. 3. 1  
     3.2                                      3.1                                      1.00 ml  
     5    10    20    50    100 μg/ml  
     50                                      1.0 μl  
     100 ml/min                                      3.3    5 min  
     5    10    20    50    100 ng  
     1  
 6. 3. 2  
 6. 3. 2. 1                                      1

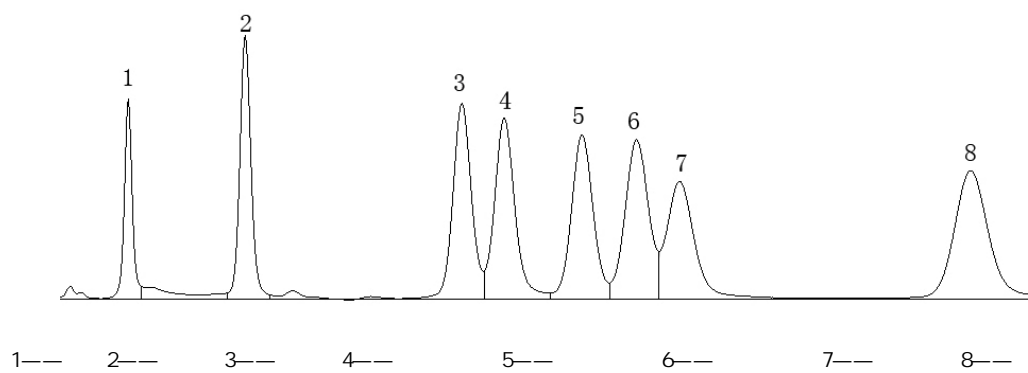


图1 填充柱色谱图

6.3.2.2

2

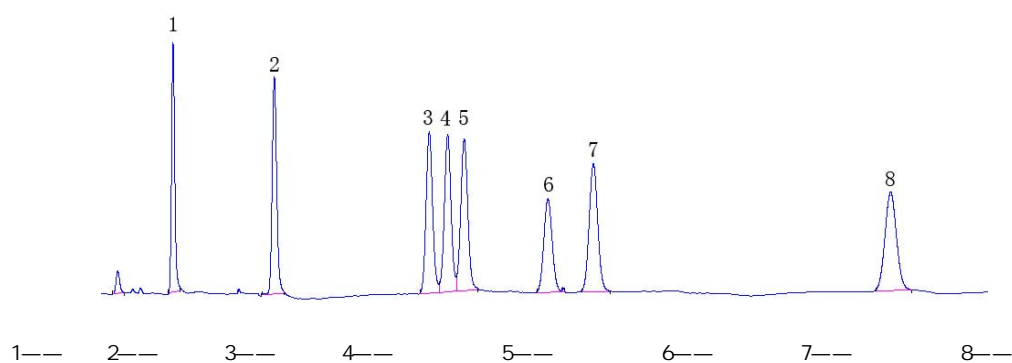


图2 毛细管柱色谱图

6.4

6.2

FID

6.4.1

6.4.2

6.5

6.4

7 结果计算及表示

7.1

1



$$\rho = \frac{W - W_0}{V_{nd} \times 1000}$$

1

$\rho$ —— mg/m<sup>3</sup>  
 $W$ —— ng  
 $W_0$ —— ng  
 $V_{nd}$ —— 101.325 kPa O L

7.2

0.1 mg/m<sup>3</sup> 0.1 mg/m<sup>3</sup>

8 精密度和准确度

8.1

					1.0 ng	50.0 ng		
				0.6	2.3	0.4	2.7	
0.6	1.5	0.3	0.7		0.04 ng	0.05 ng	1.91 ng	2.81 ng
		0.04 ng	0.06 ng	2.03 ng	2.81 ng			C
						1.0 ng	50.0 ng	
				0.8	2.3	0.8	2.7	
0.8	2.3	0.6	1.5		0.03 ng	0.06 ng	1.72 ng	2.94 ng
		0.04 ng	0.07 ng	1.72 ng	3.12 ng			C

8.2

-1.2%	0.5%			92.1%	106%		
	-1.2%	1.7%		93.4%	106%		C

9 质量保证和质量控制

9.1 Tenax

1/4

9. 2

1/4

9. 3

10

9. 4

20 40

25%

9. 5

25%

20

9. 6

20

附录A  
(资料性附录)  
填充柱的填充方法

	0.525 g	DNP	0.378 g		60 ml	90
3 h	Chromsorb G·DMCS		15 g		2 h	
				2 h		
	150	,	20 ml/min	30 ml/min		24 h

**附录B**  
**(资料性附录)**  
**苯系物的安全采样体积**

20  
B.1

200 mg Tenax-TA

表 B. 1 苯系物的安全采样体积

L
6.2
38
180
300
480
300

**附录C**  
**(资料性附录)**  
**精密度和准确度汇总表**

表 C.1 填充柱气相色谱法精密度和准确度

	ng	r ng	R ng			/ mg/L	$\overline{RE}\% \pm 2S_{RE}$	$\overline{P}\% \pm 2S_{\overline{P}}$
	1.0	0.05	0.05	0.6 2.1	1.1	161±12	0.54±0.68	97.6±3.4
	50.0	2.49	2.31	1.6 1.8	0.3	233±14	0.30±1.24	
	1.0	0.04	0.05	0.9 2.3	1.3	162±9	-0.74±0.47	97.4±1.3
	50.0	2.35	2.35	0.4 2.7	0.3	239±11	-0.70±0.24	
	1.0	0.04	0.05	0.6 2.3	1.1	163±10	-1.19±0.92	100±3.8
	50.0	2.78	2.78	1.6 2.7	0.6	239±11	-0.67±0.83	
	1.0	0.04	0.04	0.6 1.9	0.6	163±10	-1.31±1.33	96.7±4.8
	50.0	2.63	2.63	1.6 2.2	0.5	237±10	-0.59±1.41	
	1.0	0.05	0.06	1.3 2.1	1.5	162±11	-0.58±0.37	98.2±3.0
	50.0	2.51	2.52	0.8 2.7	0.6	237±10	-0.18±1.69	
	1.0	0.05	0.06	0.9 2.3	1.8	161±10	-0.23±0.45	98.2±3.4
	50.0	2.81	2.81	1.6 2.7	0.7	237±10	0.28±0.43	
	1.0	0.04	0.05	0.9 2.1	1.4	162±11	-0.43±0.75	101±5.3
	50.0	2.28	2.28	0.4 2.2	0.6	237±11	-0.79±0.45	
	1.0	0.04	0.06	0.9 2.3	1.5	200	0.35±2.23	99.9±6.9
	50.0	1.91	2.03	0.4 1.8	0.7	400	-0.49±1.08	

表 C.2 毛细管柱气相色谱法精密度和准确度

	ng	r ng	R ng			/ mg/L	$\overline{RE}\% \pm 2S_{\overline{RE}}$	$\overline{P}\% \pm 2S_{\overline{P}}$
	1.0	0.04	0.07	0.8 2.3	2.0	161±12	0.54±0.91	98.0±2.7
	50.0	2.07	2.23	08. 2.7	0.8	233±14	-0.63±1.52	
	1.0	0.04	0.06	0.8 2.0	1.8	162±9	-0.86±0.71	98.6±3.8
	50.0	2.76	2.79	1.4 2.5	0.8	239±11	-0.82±0.25	
	1.0	0.05	0.06	0.9 2.3	1.4	163±10	-1.23±0.84	99.9±2.9
	50.0	2.30	2.30	1.2 1.7	0.6	239±11	-0.68±0.81	
	1.0	0.03	0.04	0.9 1.6	1.1	163±10	-1.21±0.97	96.7±3.3
	50.0	2.94	2.94	1.4 2.5	0.8	237±10	-0.58±0.99	
	1.0	0.06	0.08	0.9 2.3	1.8	162±11	-0.51±0.15	98.2±3.9
	50.0	1.74	2.28	0.9 1.4	1.2	237±10	-0.24±1.87	
	1.0	0.06	0.06	0.8 2.1	0.8	161±10	0.10±1.10	97.8±4.0
	50.0	1.72	1.72	1.0 1.6	0.4	237±10	0.01±0.45	
	1.0	0.04	0.06	0.9 2.1	2.3	162±11	-0.41±0.41	99.1±7.0
	50.0	2.33	2.33	1.0 1.9	0.3	237±11	-0.53±0.53	
	1.0	0.05	0.07	1.3 2.3	1.9	200	1.67±1.81	99.5±7.1
	50.0	2.54	3.12	0.8 2.5	1.5	400	0.39±1.26	