



Detection of chloride in carbon dioxide

Introduction:

Carbon dioxide is the main component of dry ice, which can be used for electronic and nuclear industry cleaning, cleaning the internal grease and dirt of robots and automation equipment; Cleaning of integrated circuit boards, post weld flux, contaminated coatings, resins, solvent coatings, protective layers, and photosensitive anti-corrosion agents on printed circuit boards. Chlorine ions have strong corrosiveness to circuits or metals. This article uses ion chromatography to detect the chloride content in carbon dioxide production processes.

Table 1: Detection items

Ions	Chloride
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Keywords: Chloride, Carbon dioxide, Ion Chromatograph.

Instruments and equipment

- **Ion chromatograph:** CIC-D180
- **Ultra pure water machine:** EU-20

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Requirements

Reagents

Unless otherwise specified, all reagents used are superior grade. Commercially available certified standard solutions for chloride (1000 mg/L).

Deionized Water

When preparing standard samples manually or diluting real samples, please use ASTM filtration and deionization requirements that meet the specifications listed in the table 2.

Table 2: Deionized water specification.

Specification	
Ions Resistivity	$\geq 18.25 \text{M}\Omega \cdot \text{cm}$
Organics-TOC	<10ppb
Iron/Transition Metals	<1ppb
Pyrogens	<0.03Eu/mL
Particulates (>0.2 μm)	<1unit/mL
Colloids-Silica	<10ppb
Bacteria	<1cfu/mL

Chromatography conditions

Table 3: Analysis conditions

Instrument	CIC-D180
Eluent	15.0 mM KOH
Flow rate	0.7 mL/min
Injection volume	25 μL
Analytical column	SH-AP-1
Column oven temperature	35 $^{\circ}\text{C}$
Conductivity cell temperature	35 $^{\circ}\text{C}$
Suppressor current	45 mA

Sample preparation

The samples are sequentially connected to a pressure reducing valve, a flow meter, and an absorption bottle (two). A 50 mM NaOH solution is used as the absorption solution, and the absorption is carried out at a flow rate of 0.5 L/min for 40 minutes. The absorption solution is mixed and made to 100 mL. After adding sodium thiosulfate solution and reacting for 4 hours, it is filtered through a 0.22 μm membrane and analyzed on the ion chromatography.

Standard chromatogram

Standard chromatogram, As shown in below:

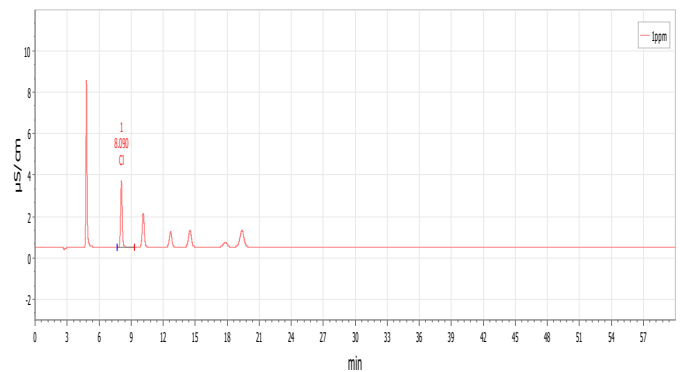


Figure 1. Chromatogram of standard sample.

Blank chromatogram

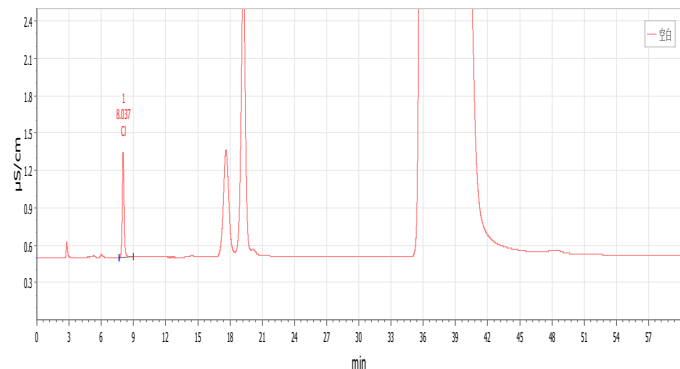


Figure 2. Chromatogram of blank.

Sample chromatogram

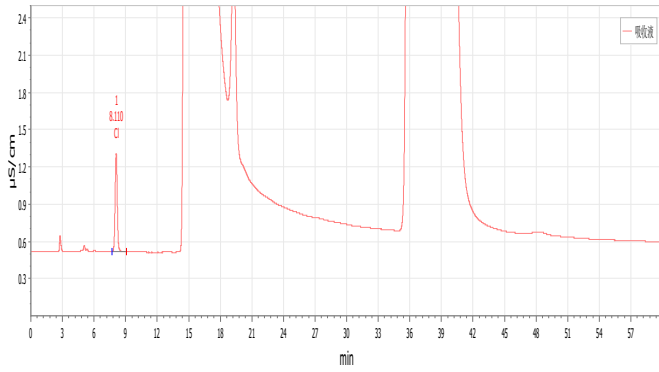


Figure 3. Chromatogram of sample

Results and calculations

Table 4: Sample test result (mg/m³)

No.	Cl ⁻
1#	0.25

Remarks: ① Blank space has been deducted from the test results; ② There may be differences in testing results between different methods and laboratories.

Feasibility analysis and conclusion

The above experiments prove that the detection method has good resolution and is suitable for the determination of the content of the components to be measured in the sample.