Detection of halogen content in rocks

Introduction:

The chloride content in rocks is an important indicator in geological research, as it can reflect the genesis, evolution, and geochemical processes of rocks. Therefore, determining the chloride content in rocks is very important for geologists. This article uses a combustion ion chromatograph to test the halogen content in rocks.

Detection items (Table 1):

Anion	F^-	Cl^-	Br^-

Keywords: Rock，Halogen， Ion chromatography

Instruments and equipment

- **Ion chromatograph**: SH-CIC3200
- **Ultra pure water machine**:ECO-S15

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Requirements

Reagents

Unless otherwise specified, all reagents used are superior grade. Commercially available certified standard solutions for F^-, Cl^-, Br^-(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	≥18.25MΩ·cm
Organics-TOC	<10ppb
Iron/Transition Metals	<1ppb
Pyrogens	<0.03Eu/mL
Particulates（>0.2μm）	<1unit/mL
Colloids-Silica	<10ppb
Bacteria	<1cfu/mL

Chromatography conditions

Table 3: Analysis conditions

Instrument	SH-CIC3200
Eluent	15 mM KOH
Flow rate	0.7 mL/min
Injection volume	25 μL
Analytical column	SH-AP-1
Column oven temperature	35℃
Conductivity cell temperature	35℃
Suppressor current	45 mA

Sample preparation

Weigh an appropriate amount of sample and place it in a sample boat for combustion ion chromatography testing.

Table 4: Sample treatment

Sample	Height（g）	Constant volume(mL)
1#	0.0226	22.32
2#	0.0808	22.32

Standard chromatogram

Standard chromatogram, As shown in below:

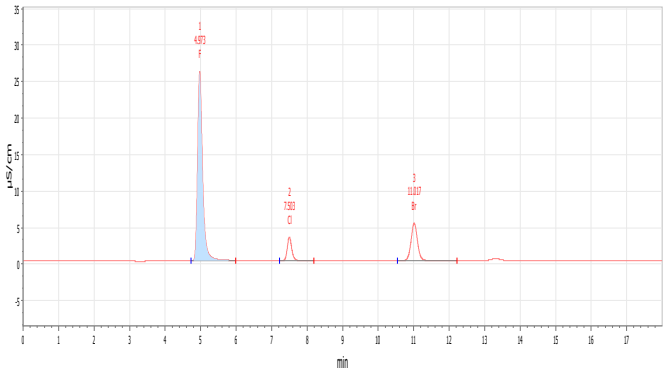

Figure 1. Chromatogram of standard sample.

Table 5: Sample treatment

Compound	Time [min]	Concentration mg/L	Area[(μS/cm)*min]
F^-	4.97	2.50	4.1314
Cl^-	7.50	0.50	0.4838
Br^-	11.01	2.50	1.0989

Blank chromatogram

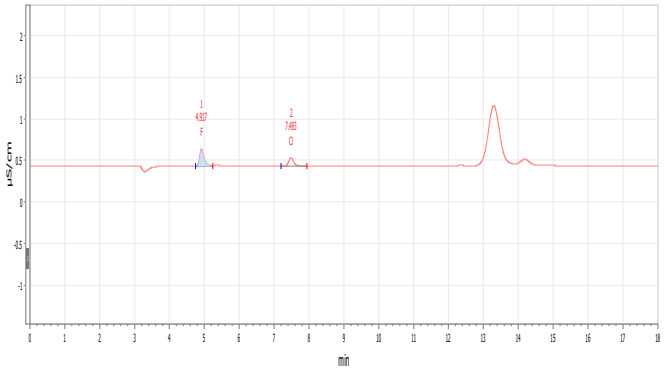

Figure 2. Chromatogram of blank

Sample chromatogram

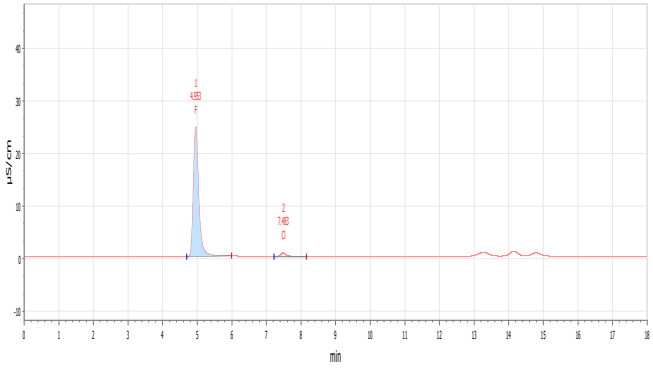

Figure 3. Chromatogram of sample 1#

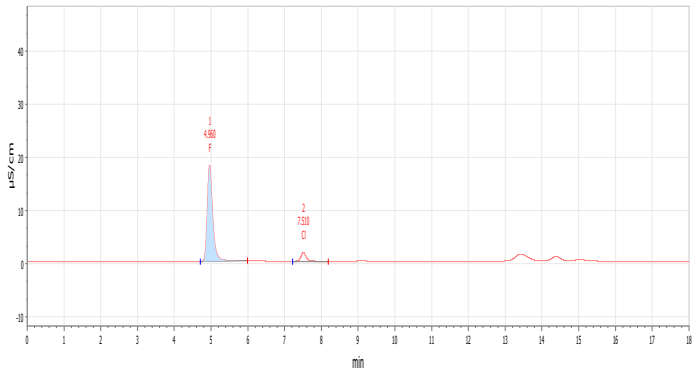

Figure 4. Chromatogram of sample 2#

Results and calculations

Table 6: Sample test result (Unit: mg/kg)

Sample	F^-	Cl^-	Br^-
1#	2230	72.79	ND
2#	483.4	70.09	ND

Remarks: ① The test result has deducted the blank space. ② ND indicates not detected or below the detection limit. ③ 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.