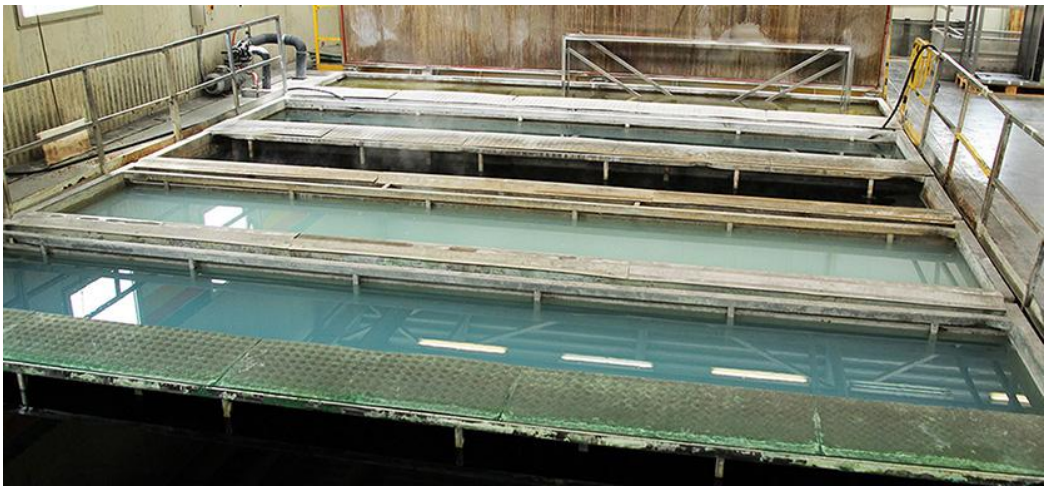
SHINE 盛瀚

ION CHROMATOGRAPHY APPLICATION NOTES

Environment Field

CATALOGUE

1.1 Determination of anions and cations in electroplating wastewater



The sources of electroplating wastewater generally include cleaning water for plating parts, waste electroplating solution and other wastewater, including flushing the workshop floor, as well as various bath solutions and drainage caused by "running, emitting, dripping and leaking" due to bath leakage or improper operation and management. The water quality of electroplating wastewater is complex and its composition varies greatly with the plating species, pretreatment process and factory management level. Ion chromatography can effectively detect anions and anions in electroplating wastewater, providing data support for wastewater discharge limit of electroplating enterprises and monitoring means for the reprocessing process of electroplating wastewater.

Analysis Conditions:

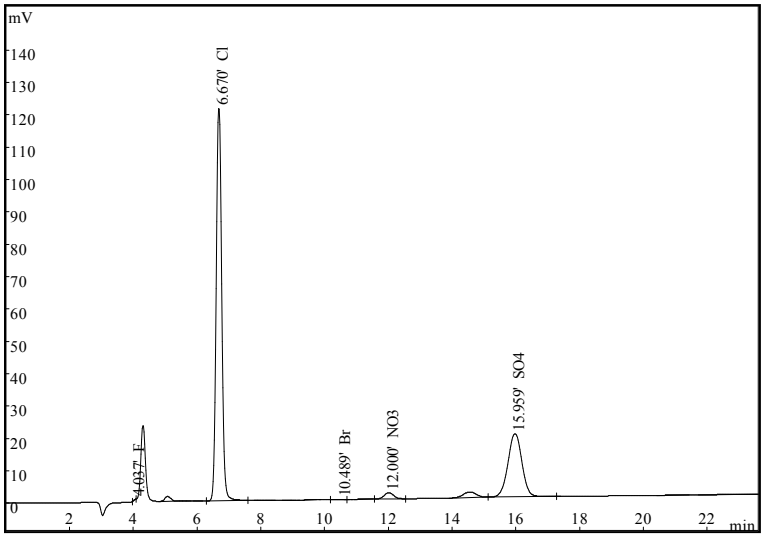
(1) Anions:

- Analytical Column：SH-G-1+SH-AC-11
- Mobile Phase：13 mM KOH
- Flow Rate：1.0 mL/min
- Suppressor：SHY-A-6

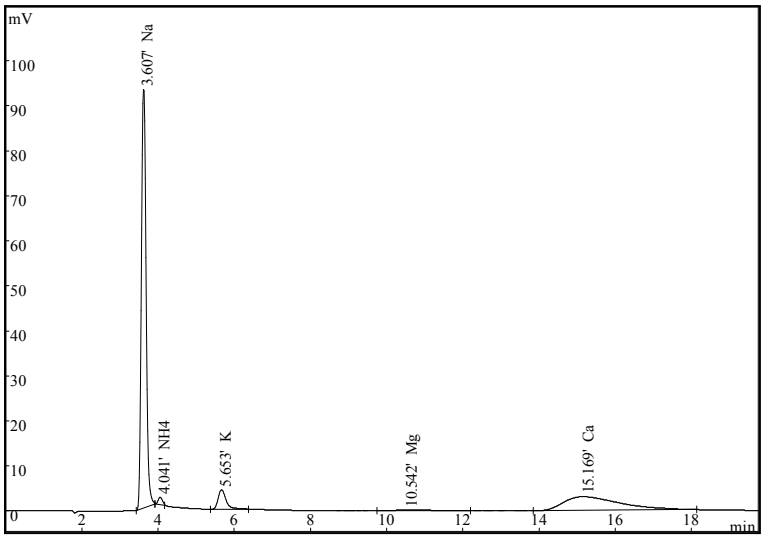
- Injection Volume：25 μL
- Pretreatment：Weigh 100μL of the sample, weigh it, accurately record the mass (accurate to 0.0001 g), dilute it to 100 mL with ultra pure water, and inject the sample through H column and 0.22 μm filter membrane for analysis.

(2) Cations:

- Analytical Column：SH-CC-4
- Mobile Phase：5 mM MSA
- Flow Rate：1.0 mL/min
- Suppressor：SHY-C-3
- Injection Volume：25 μL
- Pre-treatment：Weigh 100μL of the sample, weigh it, accurately record the mass (accurate to 0.0001 g), dilute it to 100 mL with ultra pure water, and inject the sample through H column and 0.22 μm filter membrane for analysis.



Anions Chromatogram in electroplating wastewater



Cations Chromatogram in electroplating wastewater

1.2 Determination of common anions and SCN in solid waste

Solid waste refers to the solid and semi-solid waste materials produced by human beings in production, consumption, life and other activities (the definition could be more extensive, and the wastes produced by animal activities also belong to this category). The hazardous solid waste refers to the waste listed in the national hazardous waste list or identified as hazardous waste according to the national

hazardous waste identification standards and methods.

Hazard characteristics refer to corrosiveness, acute toxicity, leaching toxicity, reactivity, infectivity, nuclear radioactivity, etc. Hazardous waste has a serious impact on the environment and even human body, so it must be disposed safely and properly. According to the national and local environmental protection laws and regulations, enterprises producing hazardous waste must conduct centralized treatment of hazardous waste, arrange special personnel to be responsible for collection and management, set up special containers for storage of hazardous waste to be transported, and submit hazardous waste to qualified enterprises for collection, transportation and treatment.

Analysis Conditions:

(1) Common Anions:

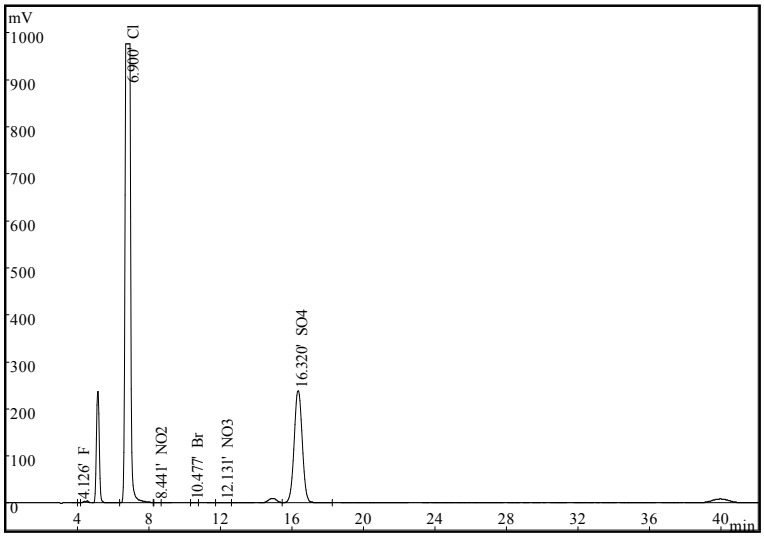
- Analytical Column：SH-G-1+SH-AC-11
- Mobile Phase：13 mM KOH
- Flow Rate：1.0 mL/min
- Suppressor：SHY-A-6
- Injection Volume：25 μL

(2) SCN

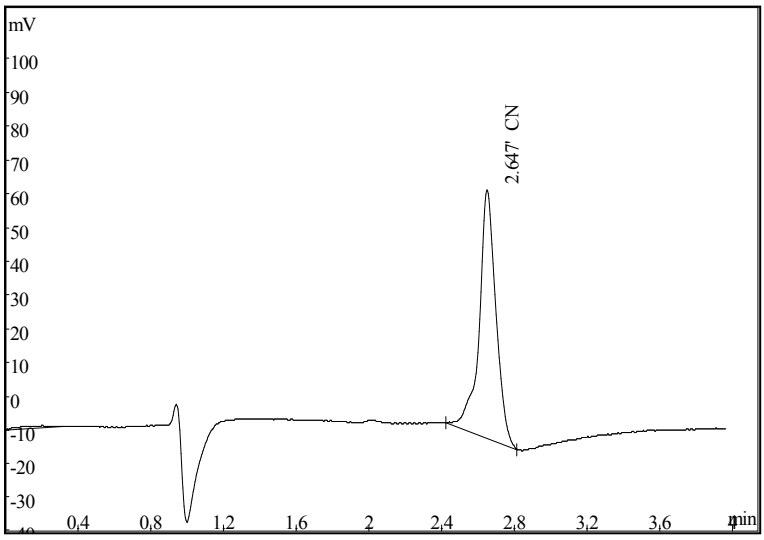
- Analytical Column：SH-AC-14
- Mobile Phase：100 mM NaOH+50 mM NaAc+0.05% Ethylenediamine
- Flow Rate：1.0 mL/min
- Detector：DC Electrochemical Detector
- Applied potential：0.07 V
- Injection Volume：25 μL

Pre-treatment: treat according to the total cyanide extraction method of HJ 484-2009 determination of SCN in water volumetric spectrophotometry. Take 200ml of sample,

transfer it into distillation flask, and add several glass beads. Add 10ml edta-2na solution to the distillation flask, add 10ml phosphoric acid quickly, immediately close the bottle plug, open the adjustable electric furnace, gradually increase from low level, and the distillate is heated and distilled at the speed of 2-4ml / min. Add 4 ml NaOH solution into the receiving bottle as the absorption solution. When the volume of the sample in the receiving bottle is close to 100ml, stop the distillation, wash the distillate tube with a small amount of water, take out the receiving bottle, dilute to 100ml with water, and shake well. Dilute the solution to be measured 500 times, and inject the sample through 0.22 μM filter membrane for analysis.



Common anions Chromatogram in solid waste



SCN Chromatogram in solid waste

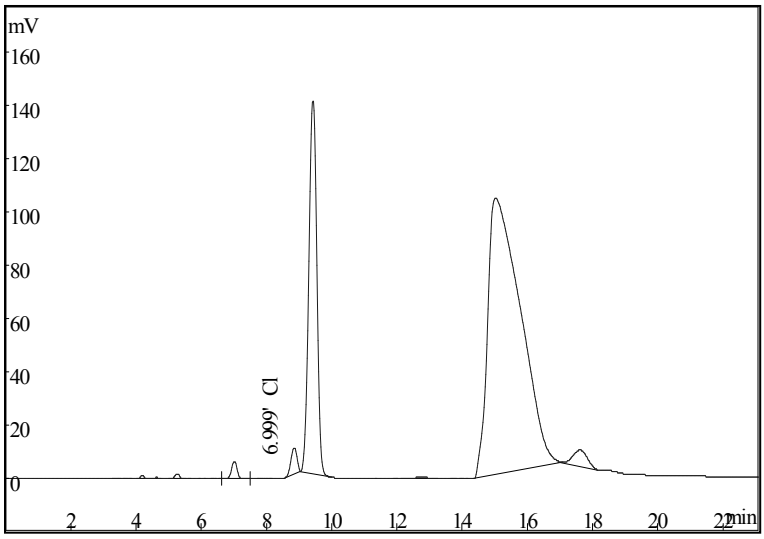
1.3 Determination of chlorine in solid waste

With the rapid development of economy, the output of garbage and waste has increased greatly. In recent years, waste incineration technology has made great progress, but there are also some problems, such as chlorine contained in waste will lead to the generation of certain amount of hydrogen chloride gas and dioxins in flue gas. Through the analysis of chlorine in different wastes, the source of chlorine can be identified, which plays an important role in improving the process and equipment of incineration plant.

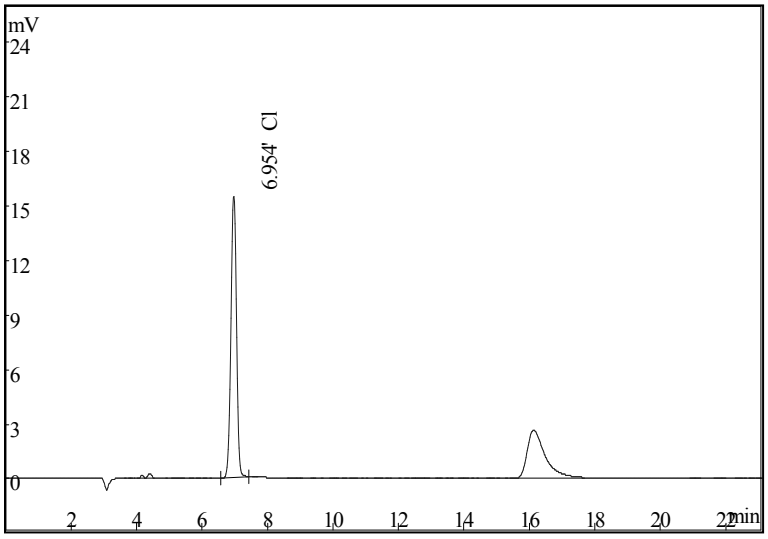
Analysis Conditions:

- Analytical Column：SH-G-1+SH-AC-11
- Mobile Phase：13 mM NaOH（EG）
- Flow Rate：1.0 mL/min
- Injection Volume：25 µL
- Suppressor：SHY-A-6

Pre-treatment: Weigh a proper amount of the sample and put it into the combustion boat for determination in the on-line combustion ion chromatograph.



Chromatogram of chloride in distillation residue



Chromatogram of chloride ion in the residue of suction filtration

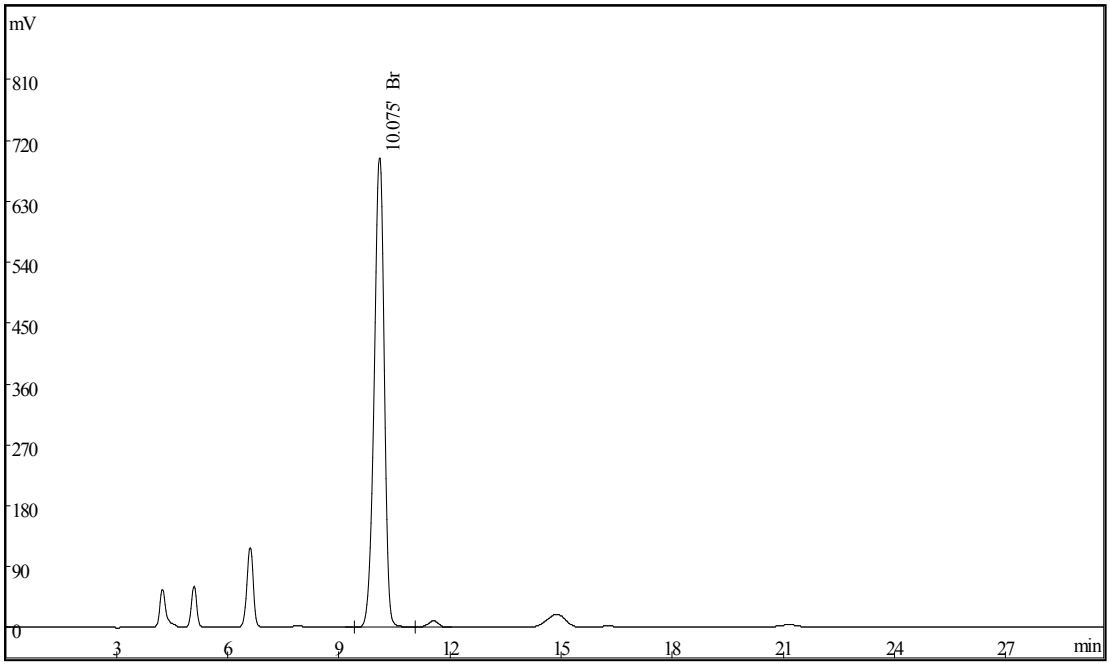
1.4 Determination of bromide ions in wastewater

The detection of bromide ion content is of guiding significance for wastewater treatment. If the content is high, it can be recycled. If the content is low, it should also be tested whether it meets the discharge standard.

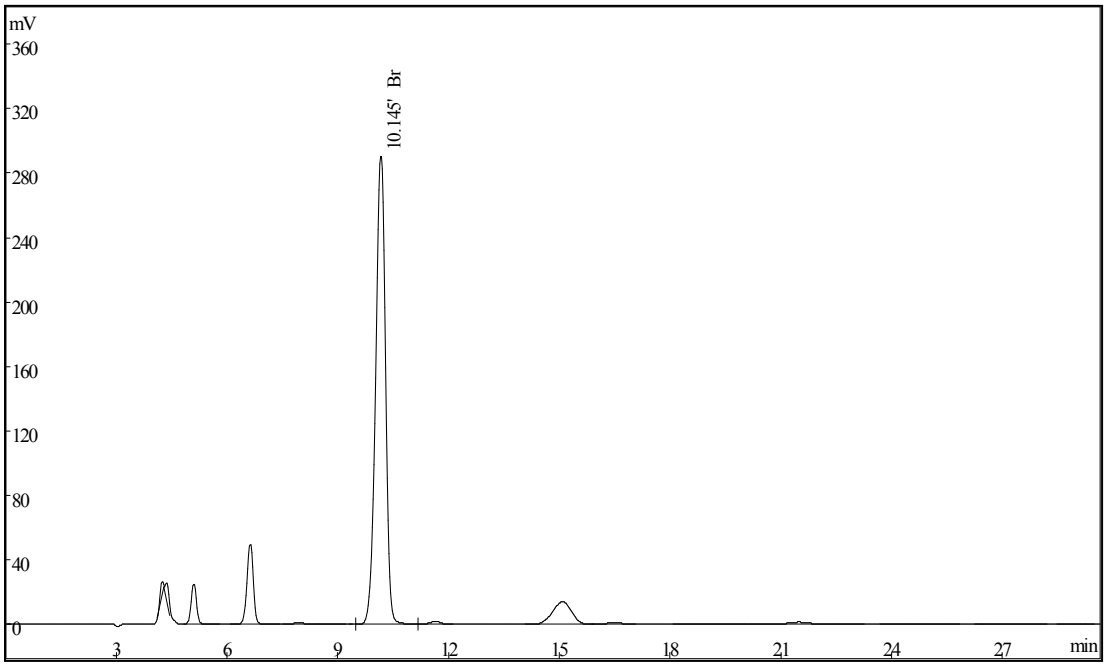
Analysis Conditions:

- Analytical Column：SH-G-1+SH-AC-11
- Mobile Phase：13 mM KOH(EG)
- Flow Rate：1.0 mL/min
- Suppressor：SHY-A-6
- Injection Volume：25 μL

Pre-treatment：Take 50 μ l etherification waste water and concentrated waste water samples respectively, weigh them (accurately record the quality to 0.0001 g), dilute them to 100 ml with ultra pure water, dilute them 10 times again, and then inject them into C18 column (remove organic matters), H column (remove heavy metals) and 0.22 μ M filter membrane for analysis.



Chromatogram of bromine ion in etherification wastewater



Chromatogram of bromine ion in concentrated wastewater

1.5 Determination of anions and cations in water samples of oil and gas fields

Oil and gas field water is a water body associated with oil and natural gas in the oil field area, which has a high degree of mineralization, a more complex chemical composition than drinking water, and the content of each chemical component is very different and contains a large number of insoluble particles and organic matters. The relationship between the composition and content of various substances in the oil field water can reflect the geological characteristics of the local oil field water, which is of great significance for oil exploitation and geological ecological protection. As one of the modern analytical instruments, ion chromatography can separate and detect many components in the sample at the same time. In SY / T 5523-2006 oilfield water analysis method, it is recommended to detect NH4 +, F -, Cl -, Br -, I -, NO3 -, PO43 -, SO42 - in oilfield water samples by ion chromatography.

Oil field water samples often contain a certain concentration of oil and fat, which has low solubility in water and strong affinity with chromatographic column

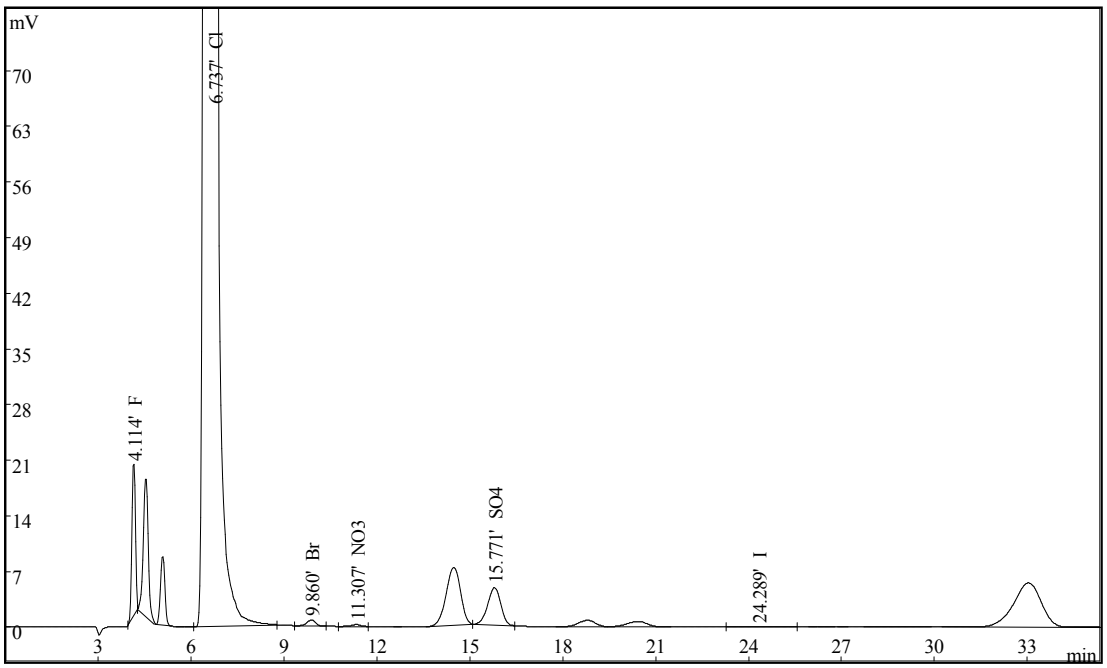
stationary phase, so it is not easy to be eluted by eluent. Therefore, the samples need to be removed by C18, H column or Na column to remove heavy metals and transition metals, and finally through 0.22 μ M filter membrane for sample analysis.

Analysis Conditions:

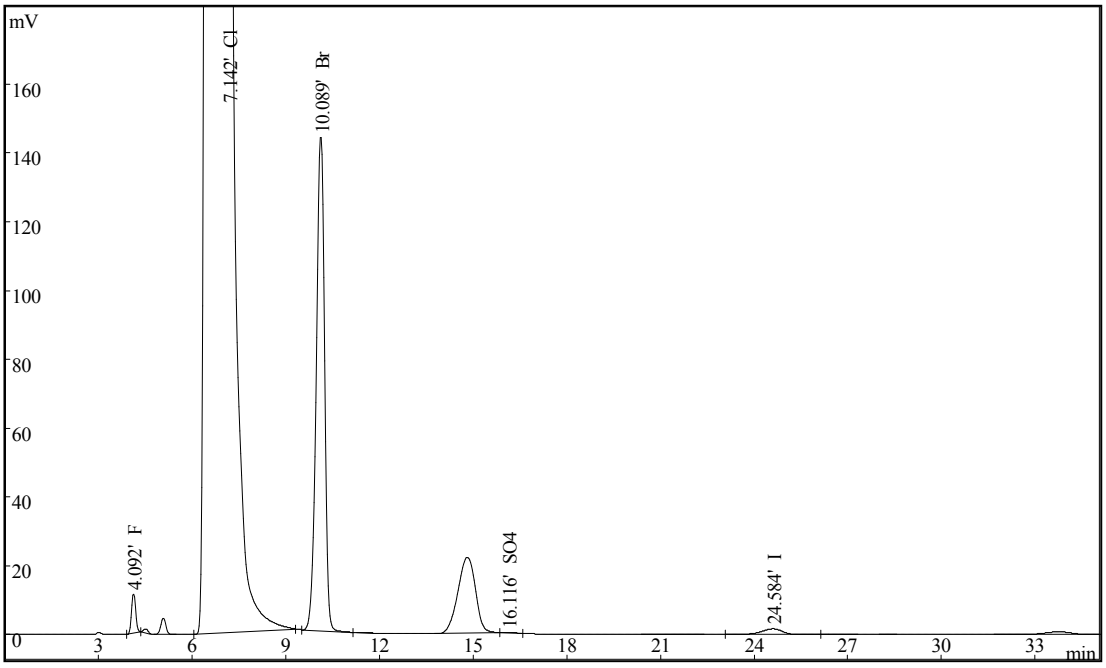
Anions

- Analytical Column：SH-G-1+SH-AC-11
- Mobile Phase：13 mM KOH
- Flow Rate：1.0 mL/min
- Suppressor：SHY-A-6
- Injection Volume：25 μL

Pre-treatment： Respectively measure 100 μ l of sample, weigh it, accurately record the mass (accurate to 0.0001 g), dilute the constant volume to 100 ml with ultra pure water, dilute the H26 solution to be measured 10 times again, analyze Cl - with C18, H column and 0.22 μ M filter membrane injection; respectively measure 1 ml of sample, weigh it, accurately record the mass (accurate to 0.0001 g), dilute the constant volume to 100 ml with ultra pure water, dilute the constant volume to 0.22 with C18, H column and 0.22 The other anions were analyzed by μ m membrane injection.



Anion chromatogram in gs001-x8



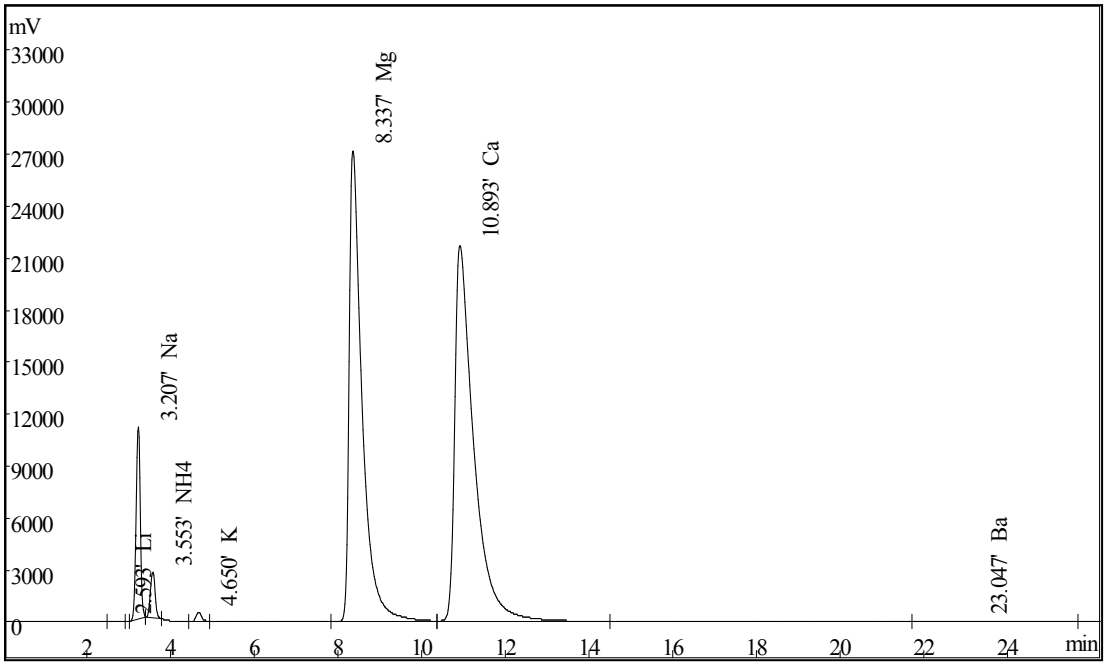
Anion chromatogram in MX008-H26

Cation

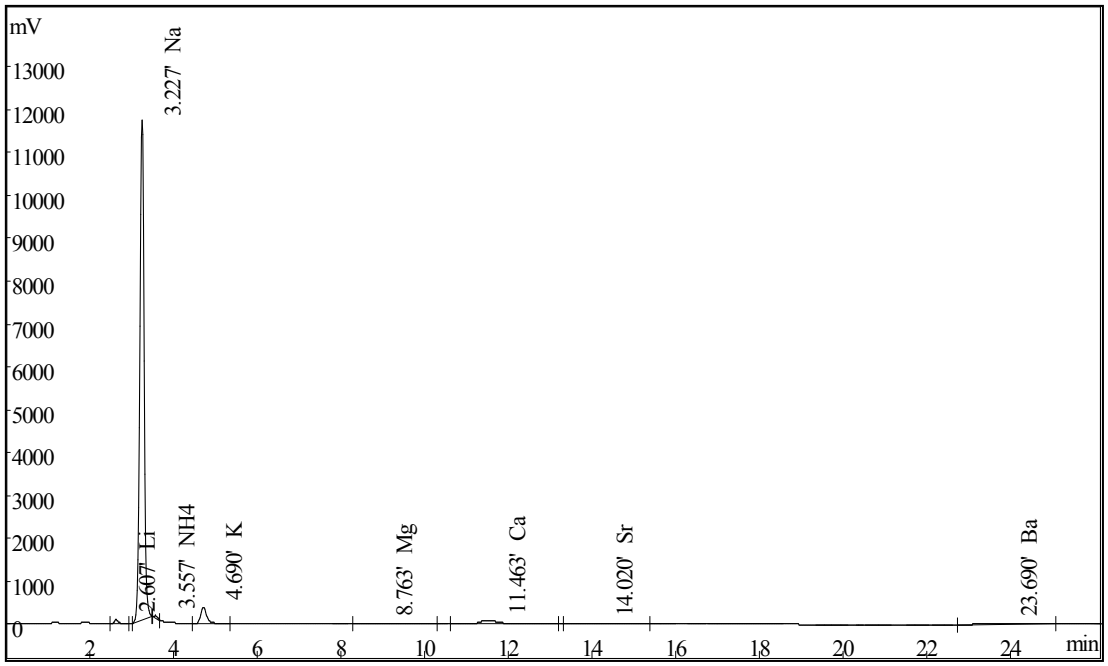
- Analytical Column：SH-YS-50
- Mobile Phase：4 mM MSA
- Flow Rate：1.0 mL/min
- Suppressor：SHY-C-3

- Injection Volume：25 μL

Pre-treatment： Measure x81 ml of sample, weigh it, accurately record the mass (accurate to 0.0001 g), dilute it to 100 ml with ultra pure water, analyze the cation through C18, H column and 0.22 μ M filter membrane; measure 100 μ l of sample H26, weigh it, accurately record the mass (accurate to 0.0001 G), dilute it to 100 ml with ultra pure water, through C18, H column and 0.22 Li +, K +, Mg2 +, Ca2 +, Sr2 +, Ba2 + were analyzed by μ M filter membrane injection, H26 sample was diluted 10 times again, Na +, NH4 + were analyzed by C18, H column and 0.22 μ M filter membrane injection.



Cation chromatogram in GS001-X8



Cation chromatogram in MX008-H26

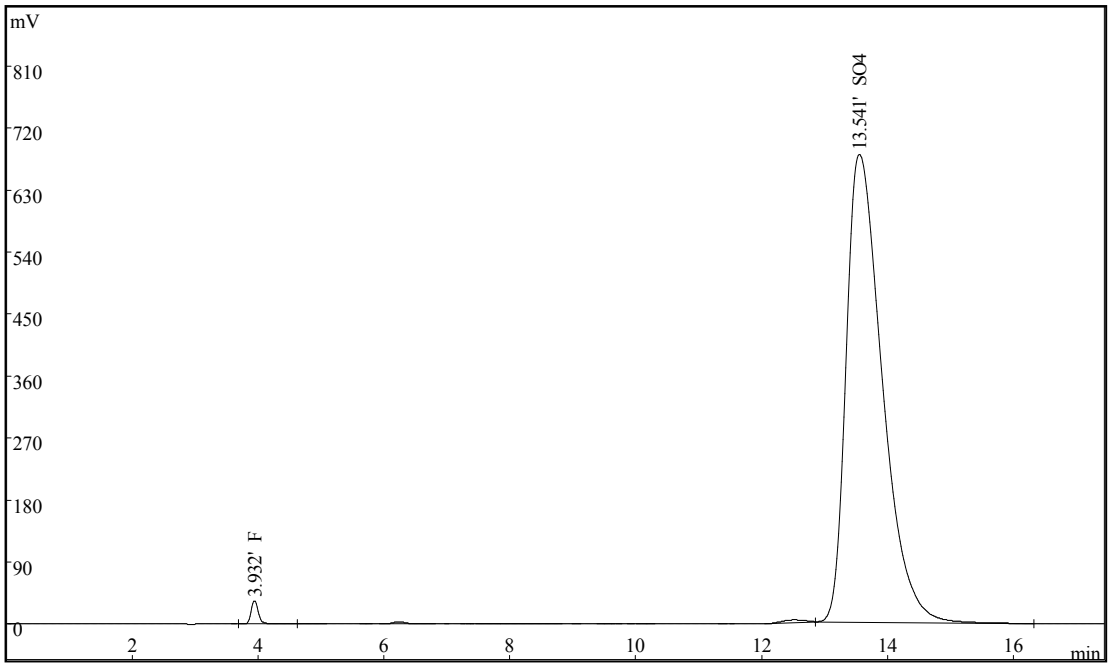
1.6 Determination of fluoride and sulfate ions in electrode waste treatment solution

There are high fluoride and sulfate ions in electrode waste treatment solution, which will cause water pollution. Therefore, the detection of anion content in electrode waste is of great significance for wastewater treatment.

Analysis Conditions

- Analytical Column：SH-G-1+SH-AC-11
- Mobile Phase：13 mM KOH
- Flow Rate：1.0 mL/min
- Suppressor：SHY-A-6
- Injection Volume：25 µL

Pre-treatment： Take 100 µ l of sample respectively, weigh it, accurately record the mass (accurate to 0.0001 g), dilute it to 100 ml with ultra pure water, and inject it through h column and 0.22 µ M filter membrane for analysis.



Chromatogram of fluoride and sulfate ions in electrode waste treatment solution

1.7 Determination of anions and cations in Laoshan mineral water

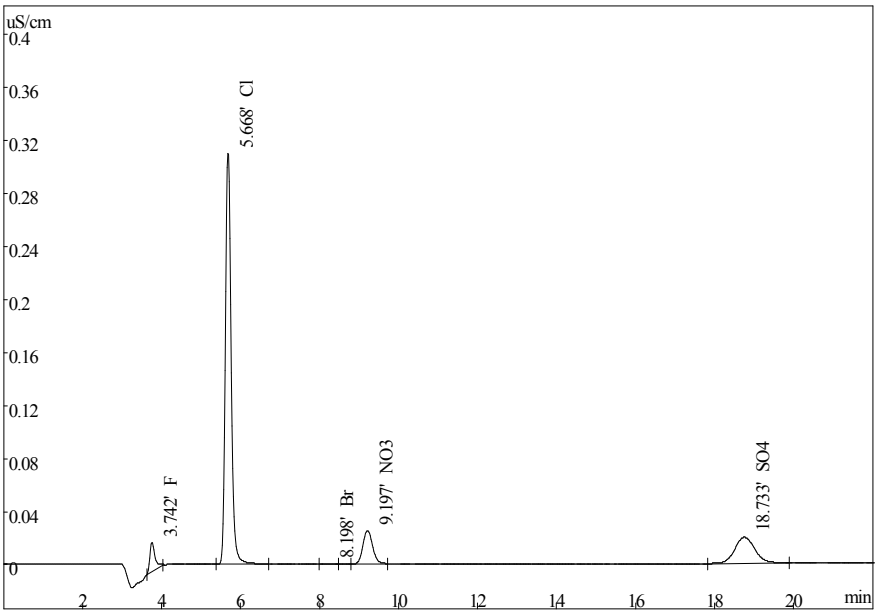
According to the national standard for drinking natural mineral water in China, the natural mineral water for drinking is the unpolluted underground mineral water naturally gushing out from the deep underground or exposed artificially; it contains a certain amount of mineral salt, trace elements and carbon dioxide gas; under normal circumstances, its chemical composition, flow rate and water temperature are relatively stable within the natural fluctuation range. In order to ensure the safety of drinkers and standardize the market order, it is of great significance to detect anions and anions in mineral water.

Analysis Conditions:

(1) Anions:

- Analytical Column：SH-G-1+SH-AC-3
- Mobile Phase：2.4 mM Na2CO3+6.0 mM NaHCO3
- Flow Rate：1.0 mL/min
- Column Temperature：35℃

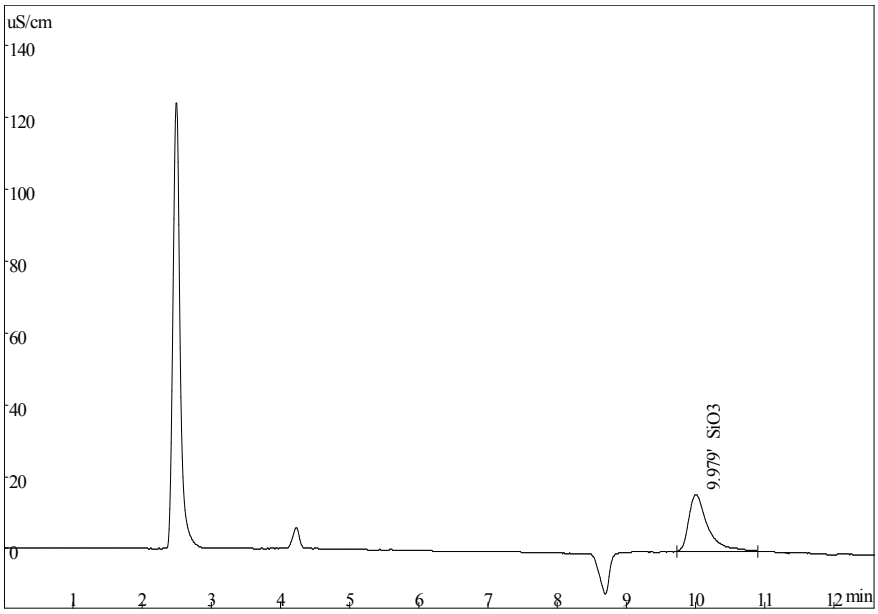
- Suppressor：SHY-A-6
- Injection Volume：25 μL
- Pretreatment：The sample was injected through 0.22 μ M filter membrane for analysis.



Chromatogram of anions in Laoshan mineral water

(2) Silicate ion

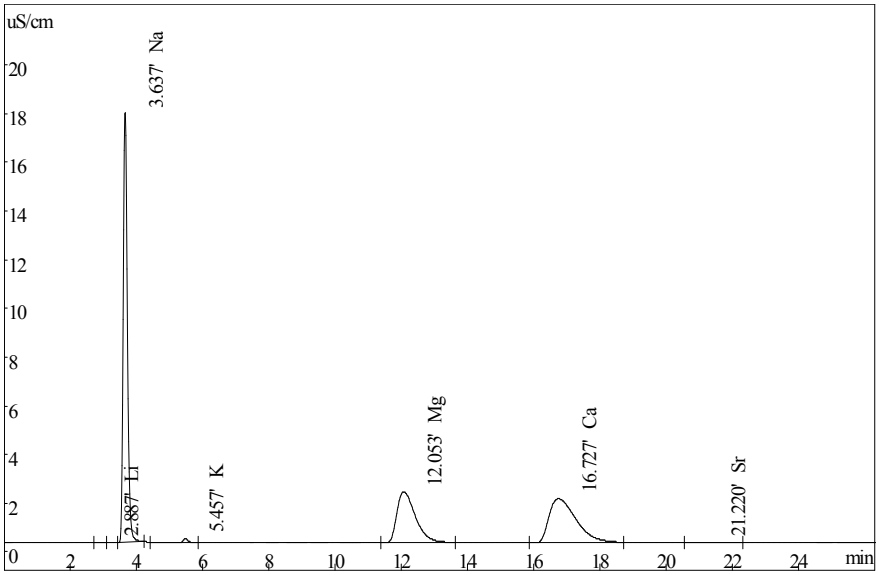
- Analytical Column：SH-Shodex 52-4E
- Mobile Phase：3.6 mM Na2CO3
- Flow Rate：0.8 mL/min
- Column Temperature：40℃
- Injection Volume：25 μL



Chromatogram of sio32 in Laoshan mineral water

(3) Cations:

- Analytical Column：SH-G-1+SH-CC-4
- Mobile Phase：5 mM MSA
- Flow Rate：1.0 mL/min
- Column Temperature：35℃
- Suppressor：SHY-C-3
- Injection Volume：25 μL



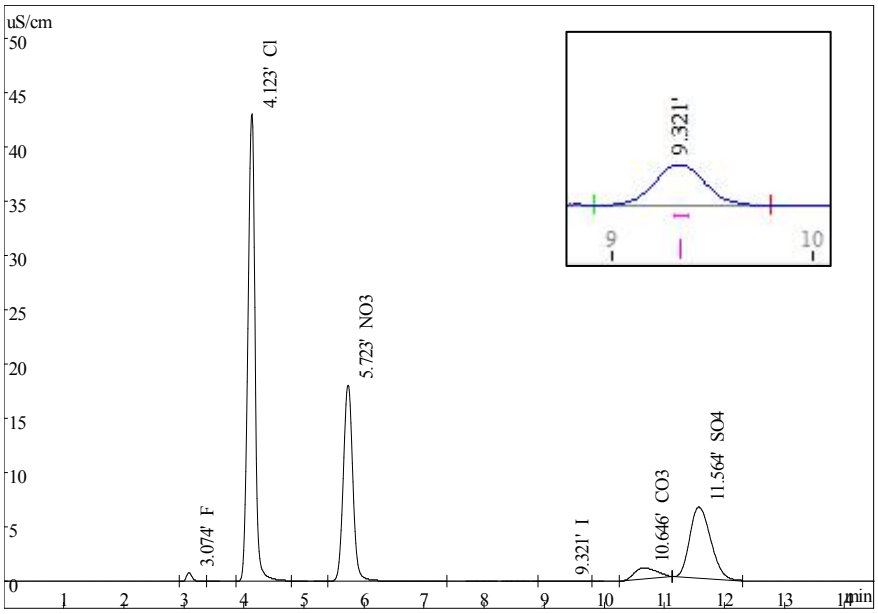
Chromatogram of cations in Laoshan mineral water

1.8 Determination of iodine in surface water

Surface water refers to rivers, lakes or freshwater wetlands, which is one of the main freshwater resources. Surface water is accumulated by natural precipitation and snow over the years, and is naturally lost to the ocean or evaporated and seeped underground.

Analysis Conditions:

- Analytical Column：SH-G-1+SH-AC-17
- Mobile Phase：7 mM KOH(EG)
- Flow Rate：1.5 mL/min
- Column Temperature：35℃
- Suppressor：SHY-A-6
- Injection Volume：50 μL
- Pretreatment：The sample was injected through 0.22 μ M filter membrane for analysis.



Chromatogram of iodine ion in surface water with standard addition of 0.1 mg / L

1.9 Determination of anions and cations in Wastewater

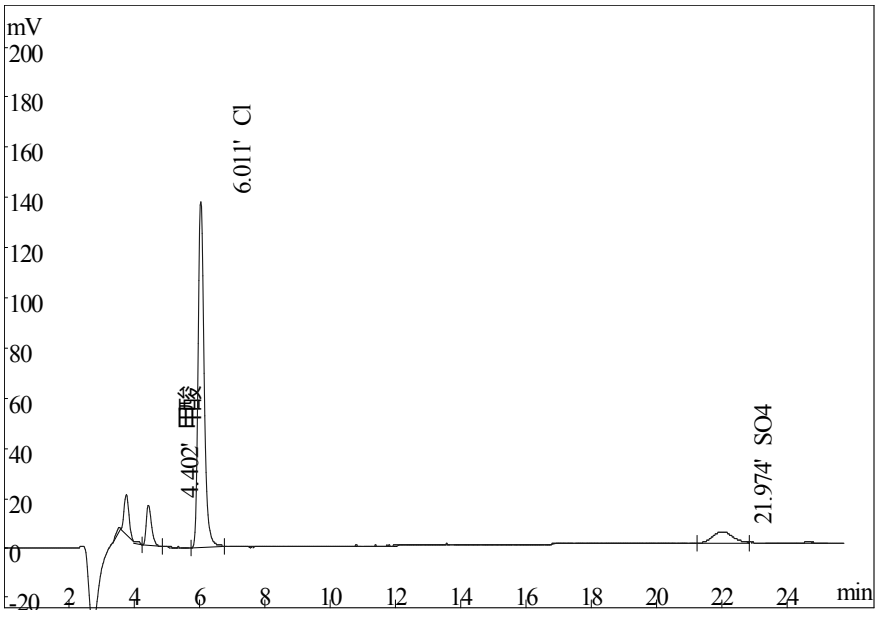
Human activities will produce a large number of industrial, agricultural and domestic sewage. If these wastewater are directly discharged into the environment, it will cause serious harm. The increasing water pollution has posed a major threat to human survival and security, and has become a major obstacle to human health, economic and social sustainable development. Fortunately, people have realized the seriousness of this problem, and have taken a series of powerful measures to control

the water pollution, and also made relevant requirements on the discharge standards of sewage, especially the emission limits of fluoride, ammonia nitrogen and phosphate. Therefore, we must monitor the treated sewage to control the content of relevant components and meet the discharge standards.

Analysis Conditions:

（1）Anions:

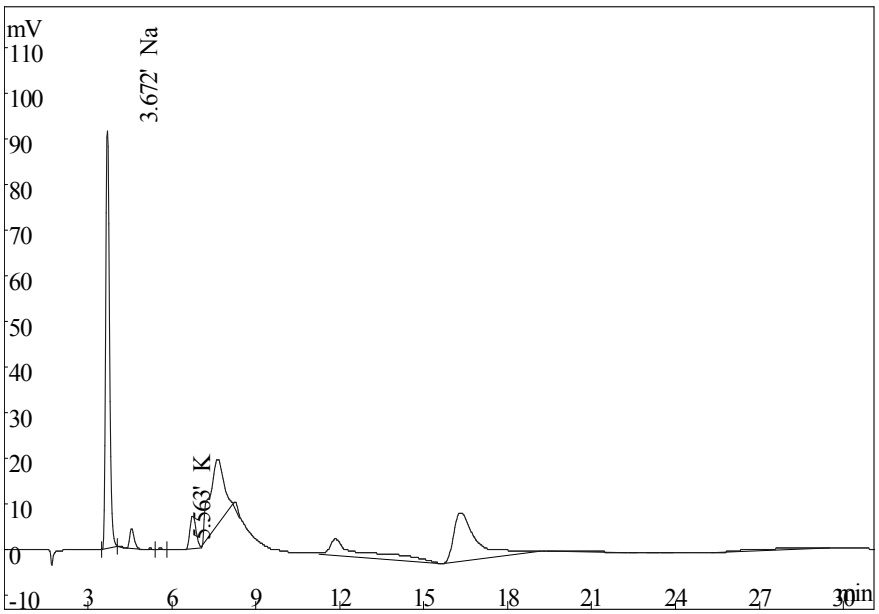
- Analytical Column：SH-G-1+SH-AC-3
- Mobile Phase：2.0 mM Na2CO3+8.0 mM NaHCO3
- Flow Rate：1.0 mL/min
- Column Temperature：35℃
- Suppressor：SHY-A-6
- Injection Volume：25 μL
- Pretreatment：The sample was diluted 10 times and injected into 0.22 μm disposable needle filter.



Chromatogram of anions in Wastewater

（2）Cations:

- Analytical Column：SH-G-1+SH-CC-4
- Mobile Phase：5 mM MSA
- Flow Rate：1.0 mL/min
- Column Temperature：35℃
- Suppressor：SHY-C-3
- Injection Volume：25 μL



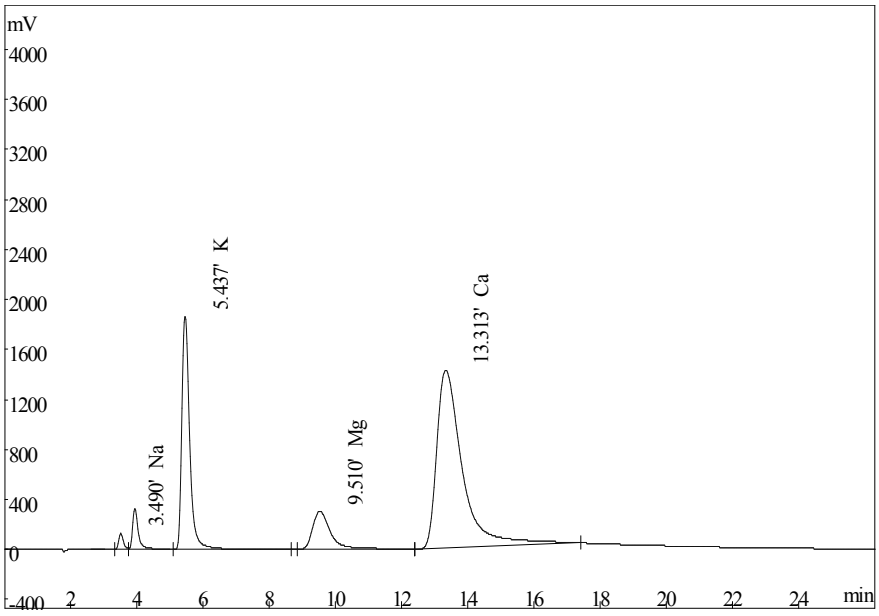
Chromatogram of sodium and potassium ions in Wastewater

1.10 Determination of cations in saline alkali soil

Alkaline soil refers to the soil whose pH is greater than 7. In practice, it refers to the soil with pH above 7.3. Generally, it includes calcareous soil, saline soil and alkaline soil. The formation of alkaline soil is controlled by various factors, and the regional differences are very significant, and salinization and alkalization often occur at the same time. The main influencing factors of alkaline soil formation are climate, topography, geology, hydrology and biology. In addition, with the development and utilization of land, especially the development of irrigation and the improper use of land, the hydrological and hydrogeological deterioration has been caused, resulting in the aggravation of soil salinization and serious harm. The accumulation of a large amount of salt in saline alkali soil, especially cations such as sodium, is easy to cause deterioration of soil physical properties, such as structural viscosity, poor permeability, etc. Therefore, the detection of cations in saline alkali soil can play a guiding role in the improvement of saline alkali soil.

Analysis Conditions:

- Analytical Column：SH-G-1+SH-CC-4
- Mobile Phase：5 mM MSA
- Flow Rate：1.0 mL/min
- Column Temperature：35℃
- Suppressor：SHY-C-3
- Injection Volume：25 μL
- Pretreatment: weigh 1g sample (accurately record the mass, accurate to 0.0001 g) into a 100 ml polytetrafluoroethylene volumetric flask, add 50 ml ultra pure water, vibrate on the oscillator for 30 min, and then use ultrapure water to fix the volume to 100 ml, shake well, stand still, take the upper liquid centrifuged for 10 min (10000 R / min), and pass the supernatant through 0.22 μ m disposable needle filter and C18 small column for sample injection analysis.



Chromatogram of cations in saline alkali soil