

1. Anions and cations from atmosphere and particles

F^- , Cl^- , NO_2^- , SO_4^{2-} , Na^+ , K^+ , NH_4^+ , Mg^{2+} , Ca^{2+} , etc. are the necessary items to be detected in the study of atmospheric quality and rainfall. Ion chromatography (IC) is the most suitable method for the analysis of these ionic substances.



- Atmospheric gas sample: Generally use solid absorption tube or absorption liquid to sample. For the analysis of sulfur dioxide and nitrogen oxides, it is generally necessary to add appropriate amount of H_2O_2 in the absorption or extraction solution, oxidize SO_2 to SO_4^{2-} , and then determine it by IC method.
- Rainfall sample: After sampling, it should be filtered immediately and stored in the refrigerator at $4^\circ C$, and analyzed as soon as possible. For the analysis of cations, appropriate acid should be added after sampling.
- Particles sample: Environmental samples of a certain volume or time were collected, and 1/4 of the collected sample were cut accurately. The filtered membranes were cut with clean scissors and put into a plastic bottle (polyester PET), deionized water is added, it is extracted by ultrasonic wave, then the volumes were fixed by a volumetric bottle. After the extract is filtered through $0.45\mu m$ microporous filter membrane, it could be analyzed; Natural dust samples were poured into beakers with quantitative deionized water and then extracted by ultrasonic wave, filtered and determined by the above same method.



According to *ASTMD5085-02(2013)* which is for the determination of chloride, nitrate and sulfate in atmospheric wet sediment by chemical suppressed ion chromatography, *EPA300.6* which is for the determination of chloride, phosphate radical, nitrate and sulfate in atmospheric wet sediment by chemical suppressed ion chromatography, *EPA300.7* which is for the determination of sodium, ammonium,

potassium, Magnesium and calcium in atmospheric wet sediment by chemical suppressed ion chromatography, anions and cations from atmosphere and particles can be analyzed.

Cations determination conditions

- Analysis column: SH-CC-3
- Guard column: SH-G-1
- Eluent: 5.0mM Methanesulfonic acid(MSA), prepare by hand or by eluent generator with methanesulfonic acid eluent.
- Suppressor: Cation suppressor(Self-regenerating electrolytic micro-Membrane suppressor)
- Detector: Conductivity detector
- Sampling volume: 25 μ L

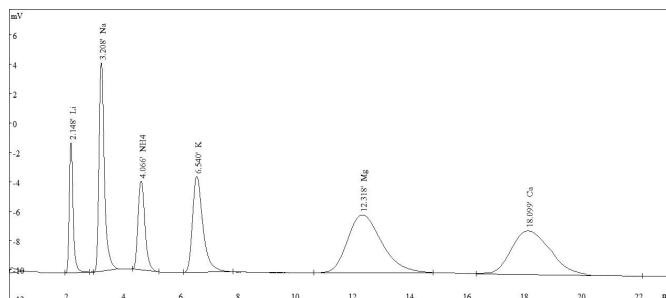


Figure 1 Spectrogram of cation analysis column (SH-CC-3)

Anions determination conditions

- Analysis column: SH-AC-4
- Guard column: SH-G-1
- Eluent: 2.0mMNa₂CO₃+10.0mMNaHCO₃
- Suppressor: Cation suppressor(Self-regenerating electrolytic micro-Membrane suppressor)
- Detector: Conductivity detector
- Sampling volume: 25 μ L

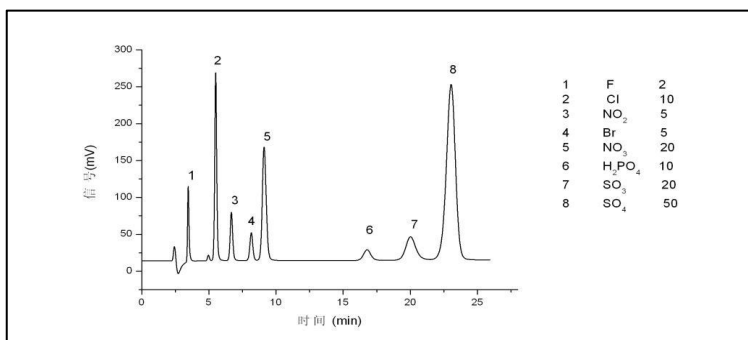


Figure 2 Spectrogram of anion analysis column (SH-AC-4)

2. Anions and cations from groundwater and surface water

According to ISO10304-1:2007 which is for the determination of dissolved anions by Ion Chromatography-Part 1: the determination of Bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulphate, SMEWW4410 which is for the determination of anions by Ion Chromatography, SME

WW4110 which is for the determination of disinfection by-products and anions, ASTM D4327-11 which is for the determination of anions in water by chemical suppressed ion chromatography, ASTM D6919-17 which is for the determination of dissolved alkali, alkaline earth cations and ammonium in water and wastewater by Ion Chromatography, anion and cation in groundwater and surface water can be analyzed.

Cations determination conditions

Refer to determination conditions for cations from atmosphere and particulates

Anions determination conditions

- Analysis column: SH-AC-11
- Guard column: SH-G-1
- Eluent: 16mMKOH, prepare by hand or by eluent generator with potassium hydroxide eluent
- Suppressor: Cation suppressor (Self-regenerating electrolytic micro-Membrane suppressor)
- Detector: Conductivity detector
- Sampling volume: 25 μ L

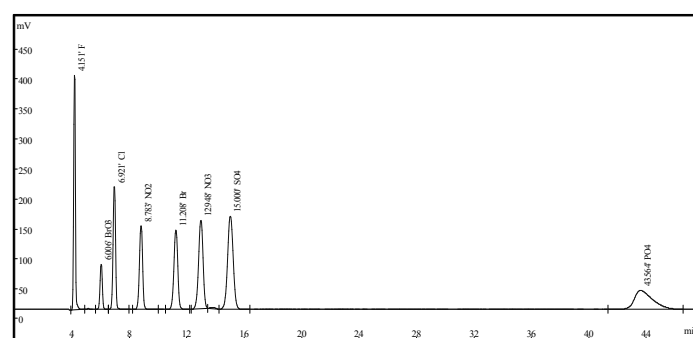


Figure 3 Spectrogram of anion analysis column (SH-AC-11)