

Sheet No.

AQF MR 023E Reference Materials

# Determination of fluorine and chlorine in clay certified reference material

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Instruments : AQF-2100H System, HF-210, GA-210, ABC-210/ASC240S

Method : Combustion-ion chromatography

Related standard :

It is critically important to know the halogen content out of consideration to the environment. Concentrations of fluorine, chlorine, bromine, iodine, and sulfur can be determined and accurately by using a combustion ion chromatography (CIC) system combining an Automatic Quick Furnace Model AQF-2100H which safely combusts samples with an ion chromatograph.

Sample name	BCR 461 Clay soil
Sample status	
Measuring items	Fluorine (F), Chlorine (Cl)
Measurement principle	Sample is thermally decomposed in argon (Ar) atmosphere, then combusted in oxygen (O <sub>2</sub> ) atmosphere. Halogens in the sample are converted to hydrogen halide and halogen gas and sulfur turns into sulfur oxide. These components are collected into absorbing solution and converted to halide ion and sulfate ion. The resulting solution is analyzed by injecting into an ion chromatograph (IC). <b>Analyzing flow</b> [Sample weighing]→[Combustion]→[Collection of combustion gas]→[IC analysis]
Parameters	<p><b>1. AQF-2100H</b></p> <p>Sample size : 20mg  Sample boat : Ceramic sample boat, SXSMBS  Additive : WO<sub>3</sub> 100mg  Pyrolysis tube : Quartz tube filled with quartz wool  Absorbent : Hydrogen peroxide / water  Mode : Constant volume mode</p> <p>HF-210 Heater Temp. Inlet : 1100degC  Outlet : 1100degC  Gas flow Ar : 200 ml/min  O<sub>2</sub> : 400 ml/min</p> <p>GA-210 Absorbent volume : 10ml  Sampling loop : 100 ul  Absorption tube : For 10 ml  Water supply : 2  Ar flow for water supply : 100 ml/min</p>

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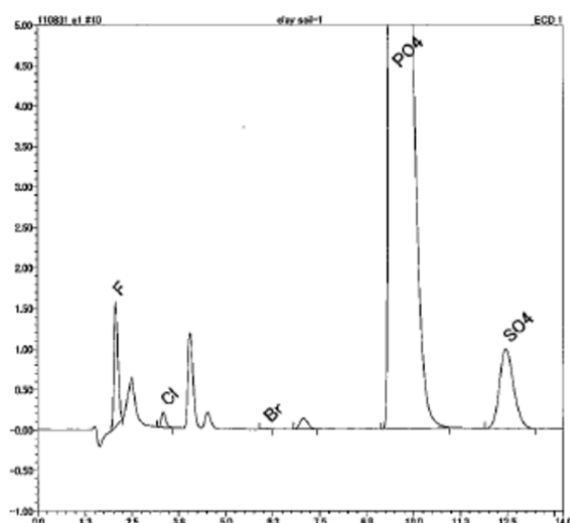
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### 2. Ion chromatograph

Ion chromatograph : DIONEX ICS-1500  
 Column : DIONEX Ion Pack AG12A / Ion Pack AS12A  
 Eluent : 2.7mM Na<sub>2</sub>CO<sub>3</sub> / 0.3mM NaHCO<sub>3</sub>  
 Eluent flow : 1.50ml / min  
 Detector : Conductivity  
 Suppressor : ASRS-4-mm  
 Measuring time : 15min  
 Sampling loop : 100 μl using GA-210 sampling loop  
 Calibration : F Cl Br S :0.1ppm to 5.0ppm

Results

### Chromatogram



### Results

	Measurement							
	F(mg/kg)		Cl(mg/kg)		Br(mg/kg)		S(mg/kg)	
CERTIFY	568	±10	(119)	(±25)	-		-	
1	534		(79.4)		/		/	
2	518		(77.6)		/		/	
3	523		(79.0)		/		/	
Avg.	525		(78.6)		/		/	
RSD(%)	1.51		(1.21)		/		/	

Remarks

\*Handling of reagents: Confirm labels and safety data sheets of reagents and handle them with enough care.

\*Automation is possible by using an Automatic Sample Changer, ASC-240S.

When ASC-240S is used, the boat to be used will be a ceramic boat, TX3SCX.

\*This application sheet is provided as reference, and does not assure the measurement results. Please consider analysis environment, external factors and sample nature for optimal conditions before the measurement.

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