

Sheet No.

AQF MR 021E Reference Materials

# Determination of fluorine, chlorine, bromine, iodine and sulfur in coal certified reference material

1/2

Instruments : AQF-2100H System, HF-210, GA-210, ABC-210/AS C-240S

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.

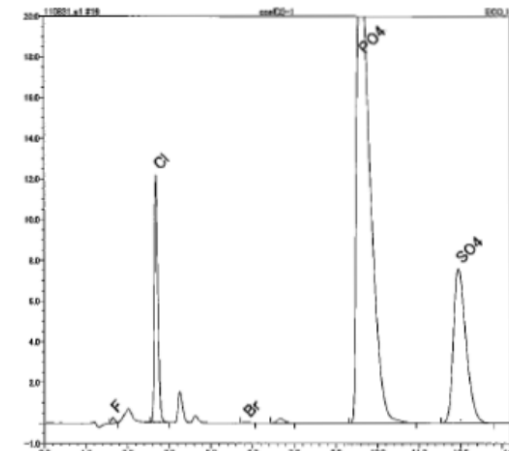
Sample name	BCR-182 - Steam coal
Sample status	
Measuring items	Fluorine (F), Chlorine (Cl)
Measurement principle	Sample is thermally decomposed in argon (Ar) atmosphere, then combusted in oxygen (O <sub>2</sub> ) atmosphere. Halogens in the sample are converted to hydrogen halide and halogen gas and 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	<b>1. AQF-2100H</b> Sample size : 30mg 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  HF-210 Heater Temp. Inlet : 900degC Outlet : 1000degC Gas flow Ar : 200 ml/min O <sub>2</sub> : 400 ml/min  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

Sheet No.

**AQF MR 021E Determination of fluorine, chlorine, bromine, iodine and sulfur in coal certified reference material**

2/2

	<p><b>2. Ion chromatograph</b></p> <p>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 : 30min                  Sampling loop : 100 μl using GA-210 sampling loop                  Calibration : F Cl Br S :0.1ppm to 5.0ppm</p>
--	--

Results	<p><b>Chromatogram</b></p> 
---------	---

	Measurement							
	F(mg/kg)		Cl(mg/kg)		Br(mg/kg)		S(mg/kg)	
CERTIFY	-		3700	±70	(36.5)		-	
1	/	/	3624		(34.7)		/	/
2	/	/	3636		(37.4)		/	/
3	/	/	3659		(36.5)		/	/
Avg.	/	/	3640		(36.2)		/	/
RSD(%)	/	/	0.49		(3.82)		/	/

**Recovery Cl=98%**

Remarks	<p>*Handling of reagents: Confirm labels and safety data sheets of reagents and handle them with enough care.</p> <p>*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.</p>
---------	--

\*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.

AQF2100H\_11\_004E