

Sheet No.

AQF MR 022E Reference Materials

Determination of fluorine and chlorine in coal certified reference material

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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-100 which safely combusts samples with an ion chromatograph.

Sample name	BCR 460 Coal (1)
Sample status	
Measuring items	Fluorine (F), Chlorine (Cl)
Measurement principle	<p>Sample is thermally decomposed in argon (Ar) atmosphere, then combusted in oxygen (O₂) 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).</p> <p>Analyzing flow [Sample weighing]→[Combustion]→[Collection of combustion gas]→[IC analysis]</p>
	<p>1. AQF-2100H</p> <p>Sample size : 30mg Sample boat : Ceramic sample boat, SXSMBS Additive : WO₃ 100mg Pyrolysis tube : Quartz tube filled with quartz wool Absorbent : Hydrogen peroxide / water Mode : Constant volume mode</p> <p>HF-210 Heater Temp. Inlet : 900degC Outlet : 1000degC Gas flow Ar : 200 ml/min O₂ : 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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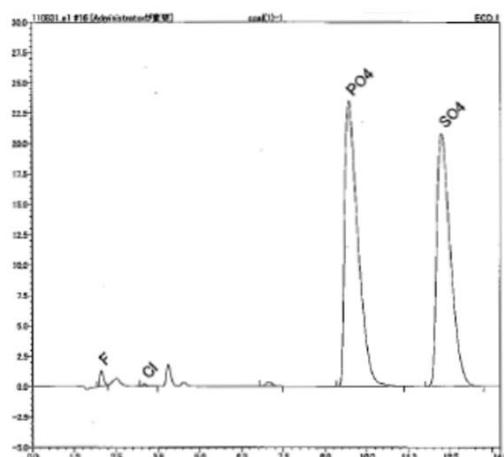
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2. Ion chromatograph

Ion chromatograph : DIONEX DX-320
 Column : DIONEX Ion Pack AG12A / Ion Pack AS12A
 Eluent : 2.7mM Na₂CO₃ / 0.3mM NaHCO₃
 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 10ppm

Results

Chromatogram



Results

	Measurement			
	F(mg/kg)	Cl(mg/kg)	Br(mg/kg)	S(mg/kg)
CERTIFY	225	(59)	-	-
1	217	(38.4)	/	/
2	201	(41.5)	/	/
3	208	(39.7)	/	/
Avg.	209	(39.9)	/	/
RSD(%)	3.90	(3.94)	/	/

Recovery F=93%

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.

*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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