Sheet No.
AQF EM 014E Materials

Determination of chlorine, iodine and sulfur in LCD components

Instruments : AQF-100
Method : Combustion-ion chromatography
Related standard :

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	Black film and adhesive, Transparent resin part
Sample status	
Measuring items	Chlorine (Cl), Iodine (I), Sulfur (S)
Measurement principle	Sample is thermally decomposed in argon (Ar) atmosphere, then combusted in oxygen (O_2) 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). **Analyzing flow** [Sample weighing]→[Combustion]→[Collection of combustion gas]→[IC analysis]
Parameters	1. AQF-100 Sample size : 50 to 100mg Sample boat : Ceramic sample boat, SXSMBS Additive : None / WO_3 Pyrolysis tube : Quartz tube filled with quartz wool Absorbent : 1000ppm Hydrogen peroxide 1000ppm Hydrazine/ Water Heater Temp. Inlet : 900degC Outlet : 1000degC Gas flow Ar : 200 ml/min O_2 : 400 ml/min GA-100 Absorbent volume : 20 ml Sampling loop : 20 ul Absorption tube : For 20 ml Water supply : 4 Ar flow for water supply : 150 ml/min ABC-100/ASC-120S

		1st	2nd	3rd	4th	5th	End	Cool
Position	(mm)	100	160					
Time	(sec)	90	90				300	60
Speed	(mm/sec)	10	0.12				20	40

Ar Time 0 (sec) O_2 Time 600(sec)

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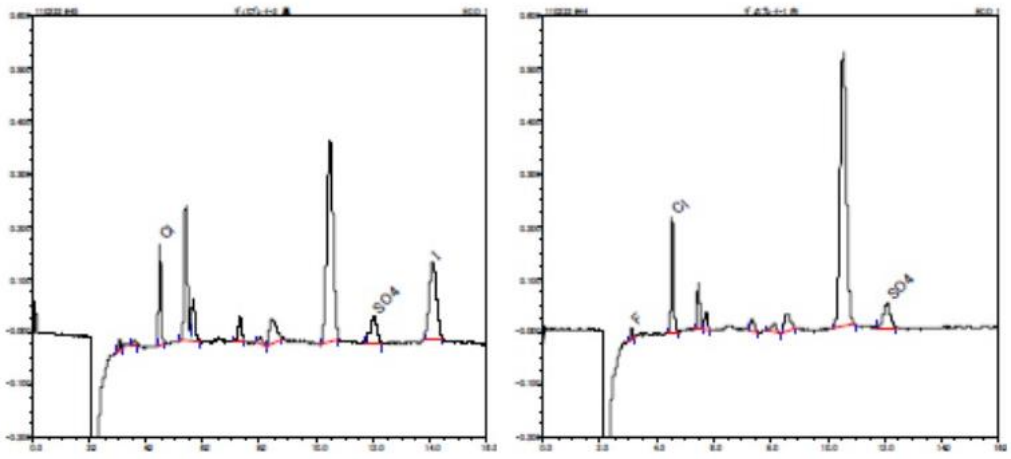
2. Ion chromatograph

Ion chromatograph	: DIONEX ICS-1500
Column	: DIONEX Ion Pack AG12A / Ion Pack AS22
Eluent	: 4.5mM Na_2CO_3 / 3.3mM $NaHCO_3$
Eluent flow	: 1.50ml / min
Detector	: Conductivity
Suppressor	: ASRS-mm
Measuring time	: 17min
Sampling loop	: 20 ul using GA-210 sampling loop
Calibration	: F Cl Br S :5ppm ～ 40pp

Results

Chromatogram



Black film, Adhesive　　Transparent resin

Results

	Sample(mg)	Cl (ppm)	S (ppm)	I (ppm)
Black film, Adhesive	17.45	201	68	1772
Transparent resin	9.11	454	114	n.a.

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-120S.
*When ASC-120S is used, the boat to be used will be a ceramic boat, TX3SCX.