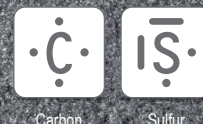


C,S determination in cement



Suitable analyzers

- ELEMENTRAC CS-i (cement configuration)
- ELEMENTRAC CS-i (standard configuration)

Most analysis data have been measured with the CS-i cement configuration. A CS-i with standard configuration can also be used with the same settings (see last measurement)

Used accessories

- Ceramic crucibles (90149)
- Tungsten (90220)
- High purity iron accelerator (88600-0013)
- Suitable calibration material (NIST or other)



Application Settings

I) General

Sample type:	Dusty Sample
Standby flow:	180 l/h
Open Furnace:	yes
Furnace purge time:	3 sec
Furnace purge flow:	180 l/h

Stabilizing

Stabilize duration:	45 sec
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II) Analysis

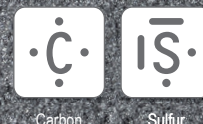
Flow:	180 l/h
Ramping:	off
Voltage:	100 %
Power duration:	45 sec
Auto comparator:	off
Drift compensation:	on

Channel	Max time [sec]	Min time [sec]	Integration delay [sec]	Comparator factor [%]
Low C	25	90	5	0.3
High C	25	90	5	0.3
Low S	35	90	9	0.3
High S	35	90	9	0.3

III) Postwaiting

Postwaiting time:	10 sec
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C,S determination in cement



Sample preparation

Make sure that the sample is disintegrated to a suitable sample size and is free from contaminations. Please dry the sample until mass constancy at 105 °C. Pre heat the ceramic crucibles at least for 1h at 1000 °C. Let the crucibles cool down in a desiccator.

Procedure

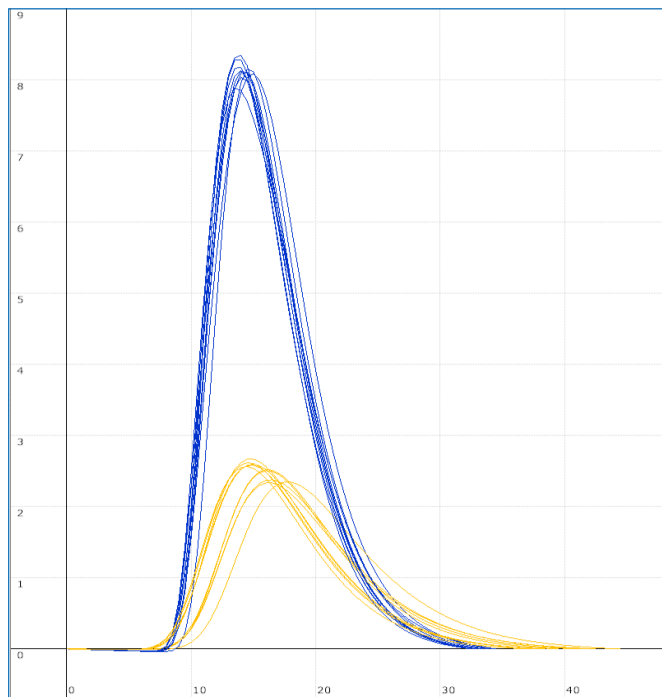
- Prepare the ELTRA analyzer (e.g. exchange anhydron, sodium hydroxide, catalyst if necessary); clean combustion tube, heat shield and furnace area
- Run three warm up samples (e.g. steel samples (92400-3050)) with a minimum weight of 500 mg and 1.7 g tungsten as accelerator
- Calibrate the analyzer with suitable calibration material (NIST or other)
 - (1) Weigh in approx. 60 – 100 mg of the sample into the ceramic crucible
 - (2) Add 0.7 g of high purity iron accelerator (88600-0013)
 - (3) Add 1.7 g of tungsten (90220)
 - (4) Place the crucible on the pedestal (use tongs!) and start analysis

Repeat steps (1) – (4) at least three times;
Mark the results and use the calibration function in the software.

→ Now start with the actual analysis.

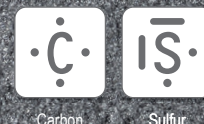


Typical results with cement configuration		
ELTRA cement 90811-53 ⁽¹⁾		
Weight (mg)	CO ₂ (%)	SO ₃ (%)
64.1	5.35	2.92
58.1	5.32	3.05
60.3	5.25	3.00
61.2	5.30	3.03
60.4	5.31	3.00
62.9	5.38	2.97
60.1	5.38	3.00
60.0	5.29	3.06
60.2	5.20	3.07
59.2	5.29	2.95
Average		
	5.31	3.01
Deviation / Rel. deviation		
	0.05 (1.1%)	0.04 (1.6%)

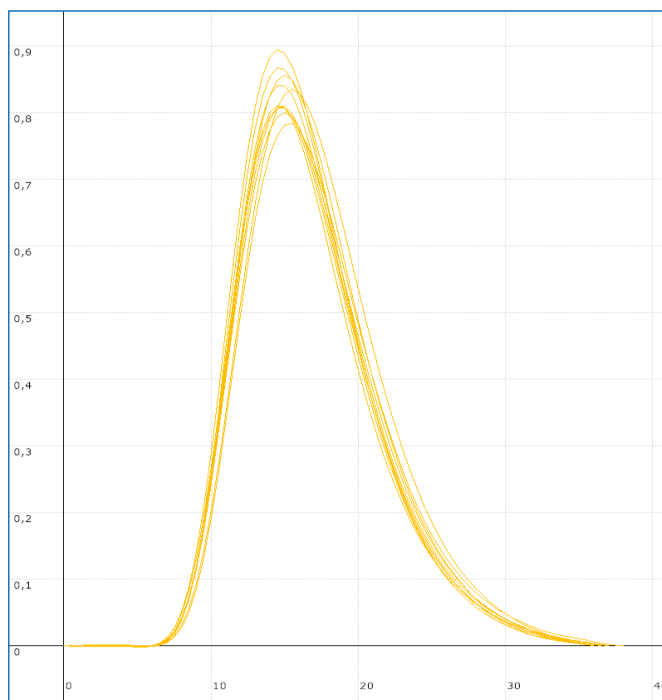


⁽¹⁾ certified values: CO₂: 5,31 % ±0.06 / SO₃: 3.01 % ±0.04

C,S determination in cement

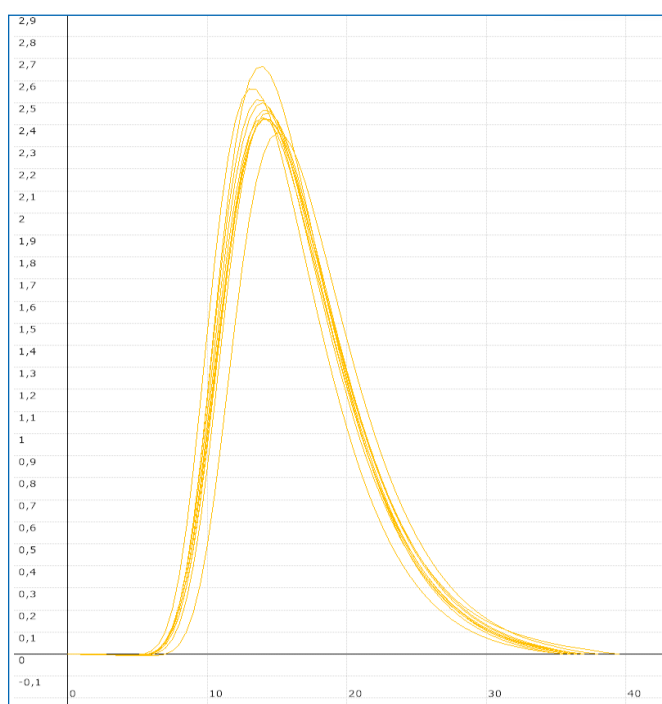


Typical results with cement configuration	
ELTRA cement 90811-81 ⁽²⁾	
Weight (mg)	SO ₃ (%)
59.2	0.94
62.2	0.87
64.4	0.90
63.6	0.84
63.0	0.86
61.8	0.94
60.5	0.89
62.9	0.93
59.8	0.92
61.9	0.93
Average	
	0.906
Deviation / Rel. deviation	
	0.03 (3.9%)



⁽²⁾ certified values: SO₃: 0.905 % ±0.03

Typical results with cement configuration	
ELTRA cement 90811 (LOT 20130205A) ⁽³⁾	
Weight (mg)	SO ₃ (%)
59.5	2.57
61.4	2.57
61.2	2.64
61.3	2.58
62.2	2.57
60.9	2.62
59.9	2.62
60.0	2.63
63.8	2.62
59.8	2.64
Average	
	2.61
Deviation / Rel. deviation	
	0.03 (1.2%)

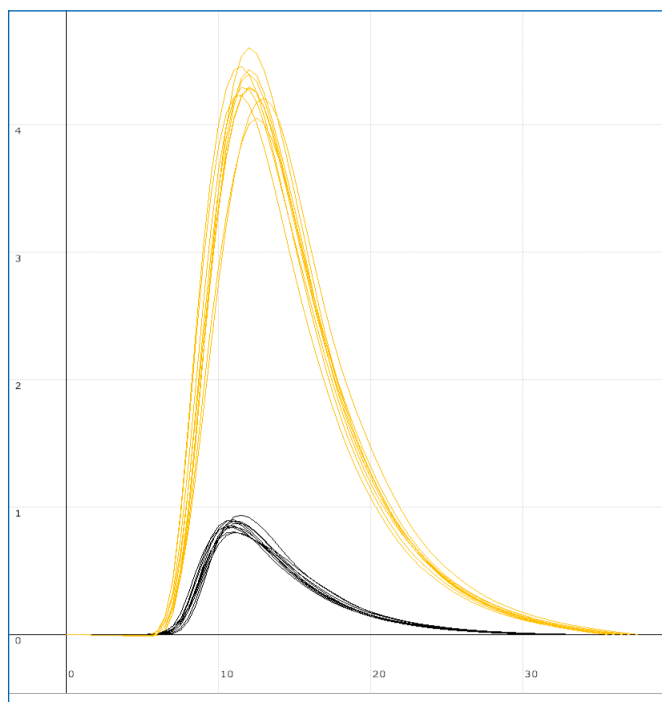


⁽³⁾ certified values: SO₃: 2.61 % ±0.04

C,S determination in cement



Typical results with standard configuration		
ELTRA cement 90811-53 ⁽¹⁾		
Weight (mg)	CO ₂ (%)	SO ₃ (%)
65.3	5.32	2.92
60.4	5.31	3.01
62.0	5.35	2.97
60.1	5.23	3.07
62.9	5.29	2.97
62.6	5.30	2.98
60.3	5.42	3.04
61.7	5.24	3.05
58.3	5.38	3.03
58.9	5.30	2.99
Average		
	5.31	3.01
Deviation / Rel. deviation		
	0.05 (1.1%)	0.04 (1.5%)



⁽¹⁾ certified values: CO₂: 5,31 % ±0.06 / SO₃: 3.01 % ±0.04