

Sulfur and Carbon in Coal, Coke, and Graphite

LECO Corporation; Saint Joseph, Michigan USA

Instrument: SC632

Sample Preparation

A representative, uniform sample is required. Samples should be prepared in accordance to ASTM D2013. Coal and coke reference materials such as those offered by LECO and NIST are properly prepared.

Accessories

528-203 Ceramic Boat

Calibration Samples

NIST, LECO coal and coke reference materials, or other suitable coal, coke, or graphite reference materials.

Method Parameters*

Description

Nominal Mass	0.35 g
Furnace Temperature	1350°C
Lance Delay Time	20 seconds
Elements to Analyze	Sulfur and Carbon

Element Parameters	Sulfur	Carbon
IR Analysis Stabilize Comparator	2.00	2.00
Manual Load Baseline Delay (s)	3	3
IR Baseline Time (seconds)	1	2
Auto Detect Data Missed Time (s)	5	5
Endline Time (seconds)	1	1
Minimum Analysis Time (s)	90	60
Maximum Analysis Time (s)	360	360
Comparator Level (%)	0.30	0.30
Conversion Factor	1.00	1.00
Significant Digits	5	5
Range Selection	Auto	Auto
Automatic Range Switch Level	3500.0	4000.0
Automatic Range Switch-Back Level	3000.0	3500.0

System Parameters

Gas Conservation Timeout	5 minutes
Auto Increment Sample Name	Disable
Lance Limits	50000
Furnace Standby Temperature	1050°C

*Refer to SC632 operator's instruction manual for method parameter definitions.



Procedure

1. Prepare instrument for operation as outlined in the operator's instruction manual.
2. Condition the system by analyzing three to five ~0.25 gram coal samples.
3. Determine and calibrate blank as outlined in the operator's instruction manual.
4. Calibrate/Drift Correct following the procedure outlined in the operator's instruction manual.
5. Analyze Samples.
 - a. Weigh ~0.1 to 0.35 gram sample into 528-203 Ceramic Boat and enter mass and identification information into Sample Login.
 - b. Click Analyze (F5) to initiate analysis. When "Load Sample into Furnace" message appears on screen, slide crucible into the combustion tube. Alternately, place crucible onto the appropriate position of carousel if equipped with auto-loader system.

Note: Carbon and sulfur results for coal and coke samples and reference materials are typically reported on a dry basis. Therefore, either the materials must be dried prior to analysis or the moisture content determined and entered during the Sample Login procedure. Samples can be dried at 105°C for one hour prior to analysis.

Typical Results (Dry Basis)

Sample	Mass	% S	% C
LECO	0.2485	0.950	82.85
502-443	0.2537	0.949	83.43
0.95% S	0.2545	0.947	83.46
83.5% C	0.2528	0.945	84.14
Coal	0.2509	0.956	83.77
	X =	0.949	83.51
	s =	0.004	0.48

NIST SRM	0.1056	0.576	91.67
2775	0.1042	0.582	91.83
Foundry	0.1017	0.577	91.80
Coke	0.1026	0.579	91.56
0.5816% S	0.1027	0.596	91.76
91.34% C	X =	0.582	91.72
	s =	0.008	0.109

UHP	0.1002	<0.001	100.40
Graphite	0.1002	<0.001	99.54
+99.99%	0.1494	<0.001	99.62
purity	0.1501	<0.001	99.40
	0.1502	<0.001	100.46
	X =	—	99.88
	s =	—	0.506

*Results based on multipoint calibration using NIST and LECO coal and coke reference materials.



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