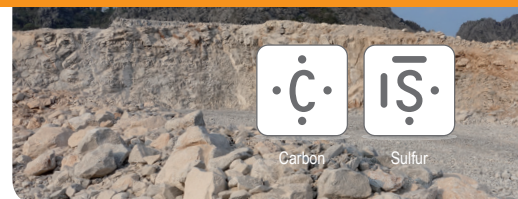


# C, S determination in limestone



## Suitable analyzers

- ELEMENTRAC CS-*i*

## 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 by time:  | on     |
| Stabilize duration: | 15 sec |

### II) Analysis

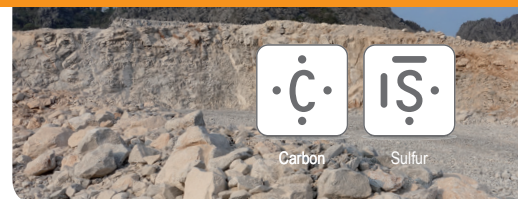
|                     |         |
|---------------------|---------|
| Voltage:            | 90 %    |
| Power duration:     | 60 sec  |
| Flow:               | 180 l/h |
| Drift compensation: | on      |

| Channel | Max time [sec] | Min time [sec] | Integration delay [sec] | Comparator level [mv] |
|---------|----------------|----------------|-------------------------|-----------------------|
| High C  | 90             | 30             | 6                       | 0.1                   |
| Low S   | 90             | 45             | 6                       | 0.1                   |

### III) Postwaiting

|                   |        |
|-------------------|--------|
| Postwaiting time: | 10 sec |
|-------------------|--------|

## C, S determination in limestone



### Sample preparation

Make sure that your sample is free from contaminations and inclusions which could influence the carbon determination. Pre-heat the crucibles at least for 1 h at 1000 °C. Let the crucibles cool down in a desiccator.

### Procedure

- Prepare ELTRA analyzer (e.g. exchange anhydron, sodium hydroxide, platin catalyst if necessary); clean the combustion tube, brush, heat shield, dust trap
- Run three warm up samples (e.g. steel samples (92400-3050) with a minimum weight of 500 mg; add 1.7 g tungsten)
- Calibrate the analyzer with suitable calibration material (NIST or other)

The procedure of analysis limestone should be like this:

- (1) Weigh in approx. 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;

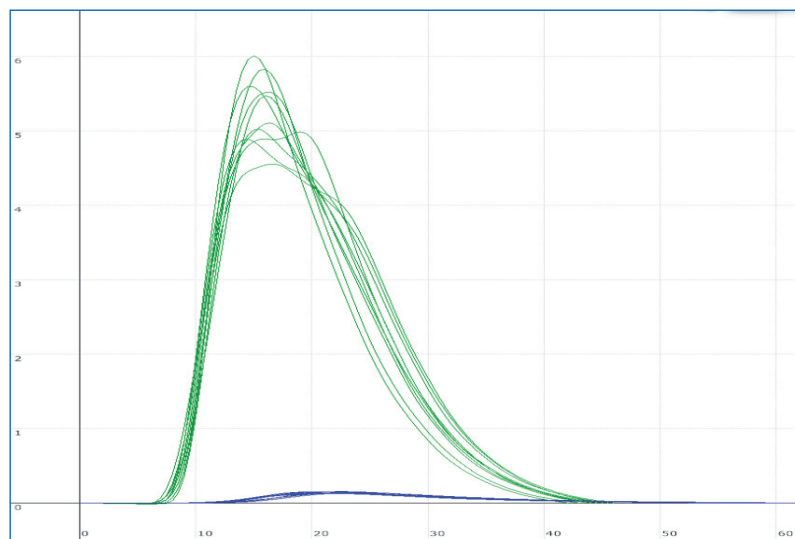
Mark the results and use the calibration function in the software.

-> Now start with the actual analysis.

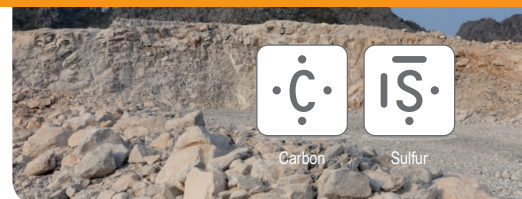


| Typical results                              |            |            |
|----------------------------------------------|------------|------------|
| ELTRA limestone 90812-3001 (LOT101602)<br>1) |            |            |
| Weight (mg)                                  | Carbon (%) | Sulfur (%) |
| 123.3                                        | 11.91      | 0.040      |
| 104.0                                        | 12.06      | 0.041      |
| 106.2                                        | 12.18      | 0.046      |
| 104.0                                        | 11.98      | 0.045      |
| 111.9                                        | 11.85      | 0.041      |
| 107.9                                        | 11.78      | 0.040      |
| 105.3                                        | 11.94      | 0.043      |
| 108.0                                        | 11.92      | 0.040      |
| 106.2                                        | 11.97      | 0.042      |
| 108.9                                        | 11.92      | 0.042      |
| Average values                               |            |            |
|                                              | 11.95      | 0.042      |
| Deviation / Relative deviation (%)           |            |            |
|                                              | 0.11/0.91  | 0.002/4.97 |

1) certified value: C: 11.97 ± 0.6 (5.01%)  
S: 0.044 ± 0.008 (18.2%)



# C, S determination in limestone



| Typical results                              |            |            |
|----------------------------------------------|------------|------------|
| ELTRA limestone 90812-3002 (LOT101602)<br>1) |            |            |
| Weight (mg)                                  | Carbon (%) | Sulfur (%) |
| 106.3                                        | 11.76      | 0.415      |
| 104.4                                        | 11.62      | 0.406      |
| 111.4                                        | 11.64      | 0.411      |
| 105.0                                        | 11.78      | 0.414      |
| 101.1                                        | 11.75      | 0.424      |
| 104.8                                        | 11.76      | 0.408      |
| 106.6                                        | 11.81      | 0.427      |
| 107.6                                        | 11.68      | 0.421      |
| 111.7                                        | 11.56      | 0.413      |
| 106.3                                        | 11.64      | 0.422      |
|                                              | 11.70      | 0.416      |
| Deviation / Relative deviation (%)           |            |            |
|                                              | 0.08/0.71  | 0.007/1.65 |

1) certified value: C: 11.72 ±0.4 (3.41%)  
 S: 0.418 ±0.04 (9.56%)

