LABMAIL #11 August 2011

ELEMENTAL ANALYSIS OF CARBON, HYDROGEN, NITROGEN AND SULFUR IN SOLID MATRICES

ALS Czech Republic has validated method for the determination of carbon, hydrogen, nitrogen and sulfur in different organic and inorganic solid matrices. The determination is based on the catalytic combustion of the sample, elimination of interfering gases, separation of the measured gases and thermal conductivity detection (TCD).

LIMS code: S-ELEM-TCD

Parameters determined by the method are listed below:

Analyte	LOR* (%)	Amount of sample		Sample container
Carbon (C)	0.1	200 mg homogeneous material	≤ 50 g heterogeneous material	Glass or metallic, tightly closed
Hydrogen (H)	0.1			
Nitrogen (N)	0.1			
Sulfur (S)	0.1			

* LOR – Limit of Reporting

Scope and application

The method is applicable to a wide range of solid matrices (waste, soil, sludge, sediment, fuel, lubricant, food and feeding stuff, plant, compost, pharmaceutical products, digests). The determination is performed on elemental analyzer vario EL III (Elementar, Germany).The method is accredited.

This method is not suitable for the determination of sulfur in inorganic sulfates, which are not totally decomposed at 1150 °C.

Parameter	Field of application
CHNS analysis of alternative fuels	fuel quality
CHNS analysis of fossil fuels	fuel quality
S analysis	soil quality
CN concentration ratio	fertility of soil
CN content of plant material	plant physiology

Interference

Fluorine, phosphate or samples containing heavy metals have a negative influence on the analysis results or the life time of instrument components.
Aggressive chemicals and materials that can create explosive gas mixtures cannot be analyzed.

Sample container and amount

Tightly closed glass or metallic container is recommended. About 200 mg of material is sufficient if homogeneous sample is delivered for analysis. Heterogeneous material containing bigger particles will be homogenized in the laboratory to < 0,07 mm using cutting mill or agate mortar. Sufficient amount of material should be delivered for homogenization (at least 50 g, depending on the sample properties).

Special Analyses

Small amount of sample

Upon request, the analysis of C, N, H and S can be performed using very small amount of sample. Only about 20 mg of fine particle material is needed. However, the limit of reporting will be compromised for all target analytes (LOR = 1%).

Routine TAT is 7 – 10 days after sample receipt.

Oxygen determination

If organic matter containing only C, H, N, S and O is analyzed, the oxygen content can be calculated from the measured data.

Reference:
(1) Vario EL III – CHNOS Elemental Analyzer: Operating instructions for instruments starting with serial-No.: 11054041 (June 2007)

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