

CNS analysis of inorganic fertilizers with the vario MACRO cube

Task

Inorganic fertilizers show a difficult combustion behaviour due to the lack of combustible organic material. The special multi-chamber furnace of the vario MACRO cube allows an extreme permanent combustion temperature up to 1200°C. This is a prerequisite for quantitative analysis of samples which are difficult to combust, especially important for sulphur analysis.

Instrument	Sample
Basis: vario MACRO cube	Quantity: 40-50 mg
Mode: CNS	Consistency: solid (powder)
Periphery: solid sample former	Preparation: not required

Specification

The samples were weighed into tin boats with WO₃ as additive. All samples have been analysed five times. By using tin boats as packing material, the combustion temperature increases up to 1800 °C.

Procedure

All fertilizer samples have been analysed once more with cellulose as additive (30 mg). The cellulose act as combustion aid. Due to the high carbon content of cellulose, the carbon content of the fertilizer cannot be determined during these analyses.

Sample	C [%]	N [%]	S [%]
Fertilizer-1	0.23 ± 0.003	12.4 ± 0.06	8.87 ± 0.05
Fertilizer-1 + cellulose	-	12.4 ± 0.06	9.14 ± 0.15
Fertilizer-2	0.70 ± 0.012	24.1 ± 0.05	5.78 ± 0.08
Fertilizer-2 + cellulose	-	24.1 ± 0.18	5.78 ± 0.38
Fertilizer-3	0.57 ± 0.005	0.50 ± 0.04	10.6 ± 0.07
Fertilizer-3 + cellulose	-	0.57 ± 0.04	10.6 ± 0.04

Results

The results show that the carbon content of the inorganic fertilizer is very low. All components could be analysed with a very high precision. The results of the analyses of the samples with and without cellulose are very similar. Hence, a complete combustion was achieved with the vario MACRO cube and the addition of cellulose is not necessary for these types of fertilizers.

The results show that the vario MACRO cube is very suitable for the analysis of inorganic fertilizers.