

DATA BULLETIN

Highly accurate CHNS analysis of substances with extraordinary elemental composition

Some substances carry extraordinary elemental ratios. A prerequisite for the elemental analysis of such compounds is reproducible analytical performance of the instrument and rigorous matrix independence of the measurement. This in turn requires quantitative conversion of the sample into the gas phase through full combustion, as well as a gas separation system that is free of matrix effects – always and in all circumstances. The UNICUBE® unifies all these requirements.

Different pure chemicals were weighed into tin boats and analyzed with a standard method. The theoretical and analyzed CHNS content and the absolute standard deviation of the analyses are presented in the table below. Please note that some substances were not available in >98 % purity.

SAMPLE	(n=x)	C [%]	H [%]	N [%]	S [%]
melamine ≥99 %	theory	28.54	4.76	66.60	-
	analysis	28.62 ± 0.02	4.75 ± 0.02	66.66 ± 0.04	-
stearic acid ≥99 %	theory	76.00	12.75	-	-
	analysis	76.07 ± 0.03	12.73 ± 0.03	-	-
bismuthiol* 98 %	theory	15.99	1.34	18.64	64.03
	analysis	15.93 ± 0.04	1.34 ± 0.02	18.68 ± 0.04	63.94 ± 0.09
anthracene ≥99 %	theory	94.34	5.66	-	-
	analysis	94.27 ± 0.04	5.63 ± 0.03	-	-
BBOT** ≥99 %	theory	72.52	6.09	6.51	7.44
	analysis	72.59 ± 0.05	5.95 ± 0.02	6.51 ± 0.05	7.32 ± 0.09

* 1,3,4-thiadiazole-2,5-dithiol

**2,5-bis(5-tert-buty-benzoxazol-2-yl)thiophene

The data demonstrates that UNICUBE is unique in accurately analyzing substances with extreme elemental ratios. An oxygen lance directs the oxygen right to the spot of combustion – exactly where it is needed for quantitative conversion of the sample into the gas phase. The patented Temperature Programmed Desorption (TPD) gas separation guarantees that no peak overlap can occur – for best peak integration results. Even extremely small peaks next to large peaks can always be reliably separated from each other by UNICUBE.

INSTRUMENT:

UNICUBE®

DETAILS:

mode: CHNS

sample: 2-4 mg pure chemicals



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