DATA BULLETIN

elementar
EXCELLENCE IN ELEMENTS

Highly accurate low ppm level nitrogen analysis in polymers

The UNICUBE® trace was developed to offer an unprecedented nitrogen concentration detection limit of 10 ppm using the well-established Dumas combustion method in combination with a selected thermal conductivity detector (TCD) with unique baseline stability. This solves a long-standing problem in the low ppm level nitrogen analysis of solids, which can be realized matrix-independently only through Dumas combustion.

Different polymer samples were weighed into tin boats and compressed with a manual pressing tool in order to remove remaining air from the packed sample. The average nitrogen concentrations, absolute standard deviation and relative standard deviation of the measurements are shown below.

SAMPLE	N [ppm]	SD [ppm]	RSD [%]
polypropylene granulate	122	13	11
polyethylene granulate	1985	25	1
polyethylene foil	56	4	7
HDPE granulate	342	13	4
unknown polymer A	627	16	3
unknown polymer B	47926	15	<1

The measurement results demonstrate impressive performance in the nitrogen concentration analysis of polymers. In the above example, the polyethylene foil sample with a nitrogen concentration of 56 ppm produced a detector signal of 320 to 340 area units. As the blank signal is only about 0-5 area units, this signal represents a huge peak detected by the TCD detector. This in turn demonstrates that much lower concentrations of nitrogen are still detectable in a robust and reliable way.

UNICUBE trace thus combines best limits of detection and best accuracy with tool-free maintenance, extraordinary instrument uptime and lowest noise emission in the industry – a true workhorse for the elemental analysis laboratory.

INSTRUMENT:
UNICUBE® trace

DETAILS:
mode: N
sample: 10-20 mg polymers

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