

# DATA BULLETIN

## 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.

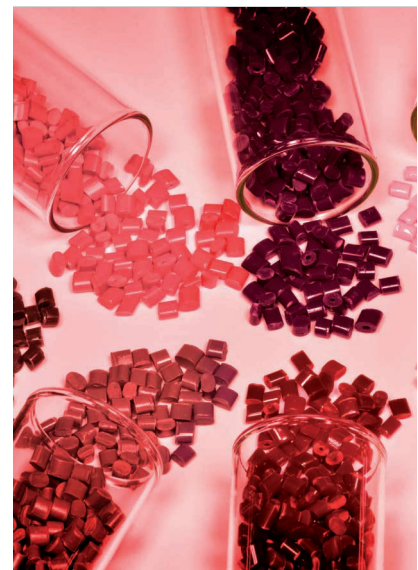
| SAMPLE                  | N [ppm] | SD [ppm] | RSD [%] |
|-------------------------|---------|----------|---------|
| polypropylene granulate | 122     | 13       | 11      |
| polyethylene granulate  | 1985    | 25       | 1       |
| polyethylene foil       | 56      | 4        | 7       |
| HDPE 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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