DATA BULLETIN

elementar
EXCELLENCE IN ELEMENTS

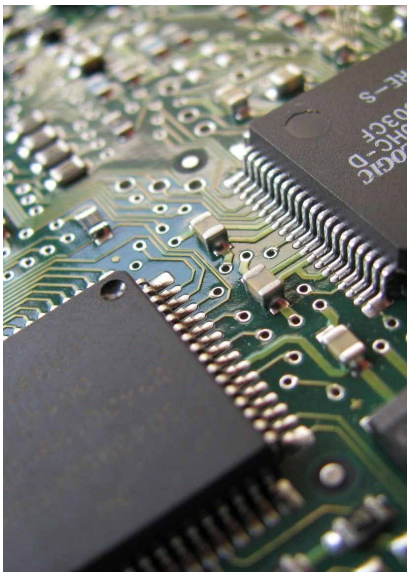
Oxygen determination in metal oxide powders for high-tech applications

Metal oxides are broadly used in various high-tech industries, in products such as semiconductors, electronics or batteries. Within the quality control processes of metal oxide materials, elemental analysis is a state of the art procedure for the determination of the oxygen content. Due to the fact that the oxygen atoms are mainly crystalline bound in such oxidic compounds, it requires extremely high temperatures to crack all bondings and release oxygen containing gases. The modern solid-state induction furnace of the inductar® ONH cube reaches the required melting temperatures directly at the sample.

INSTRUMENT:
inductar® ONH cube

DETAILS:
carrier gas: helium
sample: 1-5 mg metal oxide

Different metal oxide powders were analyzed using the inductar ONH cube. The samples were weighed in nickel capsules, placed inside a graphite crucible, using a sample weight between 1 and 5 mg. It is recommended to close the nickel capsules with a capsule press.



MATERIAL	O [%]	SD [%]	REFERENCE O [%]
copper (II) oxide (CuO)	20.29	0.19	20.11
nickel (II) oxide (NiO)	21.84	0.27	21.42
iron (III) oxide (Fe_2O_3)	29.91	0.36	30.06
tungsten (VI) oxide (WO_3)	20.77	0.32	20.70
gallium (III) oxide (Ga_2O_3)	25.84	0.30	25.61
chromium (III) oxide (Cr_2O_3)	31.79	0.25	31.58

The results presented in the table above illustrate the high accuracy of the measurement, as well as the excellent reproducibility of the analyzer. Not only oxygen, but also nitrogen and hydrogen can be determined simultaneously within one analysis for the different metal oxides. These extra information could also be of interest for several applications.

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