

Determination of carbon and sulfur in refractories

Refractories are used as furnace linings, ceramic filters or feeding aids in foundries or steel works. Elemental analysis for the determination of carbon and sulfur concentrations is routine analysis of such materials to assure the product quality. Due to the high temperature resistance of these refractories, extremely high temperatures need to be reached to combust the samples. The modern solid-state induction furnace enables such high temperatures, more than 2000°C. Furthermore, the new crucible geometry minimizes dust and debris in the system, which is important for such light ceramic powders.

The samples were milled to powder prior to combustion analysis. In general, 100 mg of the prepared samples were analyzed per analyses, but for more heterogeneous samples higher sample amounts are recommended. In order to reach the necessary temperature, accelerators (2 g EXACC WS and 0.5 g EXACC FE) were added to the sample in the ceramic crucibles.

MATERIAL	C [%]	SD	S [%]	SD
Dense refractory concrete	8.26	0.05	0.052	0.004
Ultra low cement refractory concrete	13.14	0.10	0.024	0.001
Low cement refractory concrete	25.48	0.07	0.018	0.001
Isolating feeding aid	8.137	0.142	0.0873	0.0028
Exothermal feeding aid	1.017	0.079	0.0031	0.0007
Exothermal feeding aid, expansively	4.425	0.146	0.0911	0.0027

The results, presented in the table above, clarify the high reproducibility of the measurements. Moreover, the low cross-sensitivity of the wide-range IR detector between carbon dioxide and sulfur dioxide is shown by the excellent results for the refractory concretes. In addition, even fibrous and less homogeneous samples can be precisely analyzed by the inductar® CS cube, which is proven by the results of the feeding aids.

INSTRUMENT:

inductar® CS cube

DETAILS:

carrier gas: oxygen

sample: 100 mg ceramic powder



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