

This is a preview of "ISO 21068-3:2008". [Click here to purchase the full version from the ANSI store.](#)

First edition
2008-08-01

Chemical analysis of silicon-carbide-containing raw materials and refractory products —

Part 3: Determination of nitrogen, oxygen and metallic and oxidic constituents

Analyse chimique des matières premières et des produits réfractaires contenant du carbure de silicium —

Partie 3: Dosage de l'azote, de l'oxygène et des constituants métalliques et oxydés



Reference number
ISO 21068-3:2008(E)

© ISO 2008

This is a preview of "ISO 21068-3:2008". [Click here to purchase the full version from the ANSI store.](#)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO 21068-3:2008". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword	iv
Introduction.....	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Determination of nitrogen and oxygen	2
4.1 General	2
4.2 Combined determination of nitrogen and oxygen by an analyser with thermal conductivity (CR) and infrared absorption (IR) detection	2
5 Determination of nitrogen calculated as Si_3N_4	4
5.1 General	4
5.2 Acid decomposition — Titration method	5
5.3 Acid decomposition — Photometry method	9
5.4 Inert-gas fusion — Thermal conductivity method	12
5.5 Determination of total nitrogen.....	17
6 Determination of free Iron by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES).....	17
6.1 General	17
6.2 Copper sulfate method	18
6.3 Bromine/methanol method	19
7 Determination of free aluminium and free magnesium	22
7.1 General	22
7.2 Acid decomposition — Inductively coupled plasma atomic emission spectroscopy (ICP-AES).....	22
7.3 Acid decomposition — Flame Atomic Absorption Spectrometry (FAAS).....	24
7.4 Hydrogen generating method	25
8 Analysis of oxides	26
8.1 General	26
8.2 Wet methods	26
8.3 Flame atomic absorption and/or inductively coupled plasma atomic emission spectrometer.....	26
8.4 XRF fusion method after ignition of the sample	27
8.5 Determination of silicon(IV) oxide, aluminium oxide, iron(III) oxide, titanium(IV) oxide, calcium oxide, magnesium oxide, sodium oxide, potassium oxide, chromium(III) oxide, zirconium oxide, and boron oxide	29
9 Expression of results	31
10 Test report.....	31
Annex A (informative) Statistical results obtained with analysis of refractories containing carbon and/or silicon carbide	32
Bibliography.....	37

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21068-3 was prepared by Technical Committee ISO/TC 33, *Refractories*.

ISO 21068 consists of the following parts, under the general title *Chemical analysis of silicon-carbide-containing raw materials and refractory products*:

- *Part 1: General information and sample preparation*
- *Part 2: Determination of loss on ignition, total carbon, free carbon and silicon carbide, total and free silica and total and free silicon*
- *Part 3: Determination of nitrogen, oxygen and metallic and oxidic constituents*

This is a preview of "ISO 21068-3:2008". [Click here to purchase the full version from the ANSI store.](#)

Introduction

ISO 21068, Parts 1 to 3, have been developed from the combination of a Japanese standard JIS 2011 [8] and work items originally developed within CEN. Because there is a wide variety of laboratory equipment in use, the most commonly used methods are described.

This part of ISO 21068 is applicable to the analysis of all refractory products as classified in ISO 10081 (all parts) [3], [4], [5], [6] (shaped) and ISO 1927 [1] (unshaped) and raw materials containing carbon and/or silicon carbide. Therefore, this part of ISO 21068 covers the full range of analysis from pure silicon carbide to oxidic refractory composition with a low content of silicon carbide and/or nitrides. Primarily, this part of ISO 21068 provides methods to distinguish between different carbon bound types like total carbon (C_{total}) and free carbon (C_{free}) and derives from these two the silicon carbide content.

If free carbon is present, this part of ISO 21068 includes different types of temperature treatment in order to determine the mass changes gravimetrically. Frequently, the resulting residue is used for other determinations.

The determination of other groups of analytes described in this part of ISO 21068 are free metals, free silicon (Si_{free}), free aluminum (Al_{free}), free magnesium (Mg_{free}), free iron (Fe_{free}) and the group of oxides from main to trace components.

This part of ISO 21068 also describes the chemical analysis of SiO_2 , total Si, oxygen and nitrogen and other oxidic bound metals which typically occur in the materials.

This part of ISO 21068 represents a listing of analytical methods which is approximately structured according to material composition. However, it is still the user who should prove the applicability of the method depending on the material and analytical requirements.