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**Surface chemical analysis — Chemical  
methods for the collection of elements  
from the surface of silicon-wafer working  
reference materials and their  
determination by total-reflection X-ray  
fluorescence (TXRF) spectroscopy —**

**AMENDMENT 1**  
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*Analyse chimique des surfaces — Méthodes chimiques pour collecter  
les éléments analysés de tranches de silicium comme matériaux de  
référence pour l'analyse par spectroscopie de fluorescence X en  
réflexion totale (TXRF) —*

**AMENDEMENT 1**



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## 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.

Amendment 1 to ISO 17331:2004 was prepared by Technical Committee ISO/TC 201, *Surface chemical analysis*.

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## Introduction

ISO 17331 specifies methods that allow the density of nickel and iron impurities on the surfaces of reference and test wafers to be determined. After the publication of the International Standard in 2004, relevant patents were identified. This amendment includes information on these patents in accordance with the Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC (2007-03-01).

In addition, several changes have been made to improve the accuracy of the text.

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# Surface chemical analysis — Chemical methods for the collection of elements from the surface of silicon-wafer working reference materials and their determination by total-reflection X-ray fluorescence (TXRF) spectroscopy —

## AMENDMENT 1

### *Page v, Introduction*

Add the following text at the end.

“The International Organization for Standardization (ISO) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning the collection of elements from the materials given in 10.2 and 10.3.

ISO takes no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured ISO that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with ISO. Information may be obtained from:

Toshiba Corporation — Semiconductor Company

1 Komukai toshiba-cho, Kawasaki, 212-8502 Japan

and

Covalent Materials Corporation

30, Soya, Hadano-shi, Kanagawa, 257-8566 Japan

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

### *Page 1, Clause 1*

At the end of the first paragraph add: “and their determination by total-reflection X-ray fluorescence (TXRF) spectroscopy” so that the paragraph reads:

“This International Standard specifies chemical methods for the collection of iron and/or nickel from the surface of silicon-wafer working reference materials by the vapour-phase decomposition method or the direct acid droplet decomposition method and their determination by total-reflection X-ray fluorescence (TXRF) spectroscopy.”

*Page 3, Subclause 5.4*

Delete “Ultra-pure” at the beginning of the subclause.

At the end of the Note, add: “The nitric acid specified here is available commercially as semiconductor-grade nitric acid.”

*Pages 3 to 5, Subclauses 5.8 and 5.9*

Replace “ultra-pure nitric acid (5.4)” by “nitric acid (5.4)” throughout both subclauses.

*Page 5, Subclause 5.11*

Add the following note at the end of the subclause:

“NOTE Vanadium or scandium internal standard can either be added in the scanning solution, as above, or be added directly to the droplet placed on the wafer before the droplet is dried.”

*Page 6, Subclause 6.2*

Delete “100  $\mu\text{l} \pm 1 \mu\text{l}$ , 1 000  $\mu\text{l} \pm 10 \mu\text{l}$ ,”.

*Page 11, Notes to Subclause 10.2.2*

In Note 2, replace “between 0,1 ml and 0,5 ml” by “between 100  $\mu\text{l}$  and 500  $\mu\text{l}$ ” so that the note reads:

“NOTE 2 The collected iron and/or nickel may be determined by GF-AAS or ICP-MS. In this case, the volume of the scanning solution can be between 100  $\mu\text{l}$  and 500  $\mu\text{l}$  and the drying procedure is not required.”

This change does not alter the meaning of the Note. It has been made to ensure consistency in the use of units.

*Page 11, Subclause 10.3*

In the second paragraph, insert the word “vertical” in front of “laminar-flow cabinet” so that the sentence reads:

“Place a working reference material on the wafer-stand (6.4) in the vertical laminar-flow cabinet (6.6).”

*Page 16, Annex B*

Replace the title of the annex by the following:

“Results of international inter-laboratory test programme using GF-AAS and ICP-MS”.

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