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(ISO 14706 : 2000)
(OSTEC/JSA)

Surface chemical analysis—Determination of surface elemental contamination on silicon wafers by total-reflection X-ray fluorescence (TXRF) spectroscopy

ICS 71.040.40

Reference number : JIS K 0148 : 2005 (E)

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal of establishing a Japanese Industrial Standard from The Foundation of Osaka Science & Technology Center (OSTEC)/ Japanese Standards Association (JSA), with a draft of Industrial Standard based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

This Standard has been made based on **ISO 14706** : 2000 *Surface chemical analysis—Determination of surface elemental contamination on silicon wafers by total-reflection X-ray fluorescence (TXRF) spectroscopy* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Surface chemical analysis— Determination of surface elemental contamination on silicon wafers by total-reflection X-ray fluorescence (TXRF) spectroscopy

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **ISO 14706** *Surface chemical analysis—Determination of surface elemental contamination on silicon wafers by total-reflection X-ray fluorescence (TXRF) spectroscopy* published in 2000 without modifying the technical contents of the original International Standard.

The portions given dotted underlines are the matters not stated in the original International Standard.

The numbers in the brackets [ ] following the terms and writing in the forward, contents, text and annex indicate the number of the bibliography.

ISO 14706 was prepared for the measurement of surface elemental contamination on silicon wafers on the basis of three existing standards: **ASTM F 1526**, **SEMI** Standard **M33** and a **UCS** (Ultra-Clean Society) standard published by the Institute of Basic Semiconductor Technology Development.

TXRF needs reference materials to perform quantitative analyses. Certified reference materials are not available at low densities of 10^{10} atoms/cm^2. Even if they were available, the possibility of contamination from the environment reduces the shelf life of such reference materials.

Therefore, the TXRF reference materials should be prepared and analysed for calibration by each relevant analytical laboratory. Thus, two standards, one for the TXRF measurement procedure and the other for the preparation of reference materials, are necessary. This Standard concerns the former part.

1 Scope This Standard specifies a TXRF method for the measurement of the atomic surface density of elemental contamination on chemomechanically polished or epitaxial silicon wafer surfaces.

The method is applicable to:

— elements of atomic number from 16 (S) to 92 (U);

— contamination elements with atomic surface densities from 1×10^{10} atoms/cm^2 to 1×10^{14} atoms/cm^2;

— contamination elements with atomic surface densities from 5×10^{8} atoms/cm^2 to 5×10^{12} atoms/cm^2 using a VPD (vapour-phase decomposition) specimen preparation method (see **3.4**).

NOTE : The International Standard corresponding to this Standard is as follows.