
**Surface chemical analysis —
Vocabulary —**

**Part 2:
Terms used in scanning-probe
microscopy**

Analyse chimique des surfaces — Vocabulaire —

Partie 2: Termes utilisés en microscopie à sonde à balayage



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 201, *Surface chemical analysis*, Subcommittee SC 1, *Terminology*.

This second edition cancels and replaces the first edition (ISO 18115-2:2010), which has been technically revised.

ISO 18115 consists of the following parts, under the general title *Surface chemical analysis — Vocabulary*:

- *Part 1: General terms and terms used in spectroscopy*
- *Part 2: Terms used in scanning-probe microscopy*

Introduction

Surface chemical analysis is an important area which involves interactions between people with different backgrounds and from different fields. Those conducting surface chemical analysis might be materials scientists, chemists, or physicists and might have a background that is primarily experimental or primarily theoretical. Those making use of the surface chemical data extend beyond this group into other disciplines.

With the present techniques of surface chemical analysis, compositional information is obtained for regions close to a surface (generally within 20 nm) and composition-versus-depth information is obtained with surface analytical techniques as surface layers are removed. The terms covered in this part of ISO 18115 relate to scanning-probe microscopy. The surface analytical terms covered in ISO 18115-1 extend from the techniques of electron spectroscopy and mass spectrometry to optical spectrometry and X-ray analysis. Concepts for these techniques derive from disciplines as widely ranging as nuclear physics and radiation science to physical chemistry and optics.

The wide range of disciplines and the individualities of national usages have led to different meanings being attributed to particular terms and, again, different terms being used to describe the same concept. To avoid the consequent misunderstandings and to facilitate the exchange of information, it is essential to clarify the concepts, to establish the correct terms for use, and to establish their definitions.

The terms and definitions in this International Standard have been prepared in conformance with the principles and style defined in ISO 1087-1:2000 and ISO 10241:1992. Essential aspects of these standards appear in 2.1 to 2.3. This part of ISO 18115 comprises the 98 abbreviations and 277 definitions of the combined ISO 18115-2:2010 and Amendment 1 to ISO 18115-2:2010. Corrections have been made to terms 3.23, 3.25, 3.36, 5.52, 5.53, 5.54, 5.55, 5.73, 5.83, and 5.151 that appeared in ISO 18115-2:2010. The terms are given in alphabetical order, classified under [Clauses 3, 4, and 5](#) from the former International Standard with corrections and [Clauses 6 and 7](#) from Amendment 1:

[Clause 3](#): Definitions of the scanning-probe microscopy methods;

[Clause 4](#): Acronyms and terms for contact mechanics models;

[Clause 5](#): Definitions of terms for scanning-probe methods;

[Clause 6](#): Definitions of supplementary scanning-probe microscopy methods;

[Clause 7](#): Definitions of supplementary terms for scanning-probe methods.

Many terms concerned with profilometry, or more correctly, surface texture measuring instruments, may be found in ISO 3274 and ISO 4287. ISO 3274 specifies the properties of the instrument that influence profile evaluation and provides basic considerations of the specification of contact (stylus) instruments (profile meter and profile recorder) whereas ISO 4287 concerns some issues involving surface texture.

Those interested in a more detailed understanding of profilometry or surface texture measuring instruments should consult ISO 3274, ISO 4287, ISO 25178, and other referenced documents.

Surface chemical analysis — Vocabulary —

Part 2:

Terms used in scanning-probe microscopy

0 Scope

This International Standard defines terms for surface chemical analysis. ISO 18115-1 covers general terms and those used in spectroscopy while this part of ISO 18115 covers terms used in scanning-probe microscopy.

1 Abbreviated terms

In the list below, note that the final “M”, given as “microscopy”, may be taken equally as “microscope”, depending on the context. References to the entries where the abbreviations, or keywords in the abbreviations, are defined are given in brackets.

3D-PFM	vector PFM (see 6.21)
AFM	atomic-force microscopy (see 3.2)
AM-AFM	amplitude modulation atomic-force microscopy (see 6.1)
AM-KPFM	amplitude modulation Kelvin-force microscopy (see 6.2)
ANSOM	apertureless near-field scanning optical microscopy (deprecated) (see 3.36)
ASNOM	apertureless scanning near-field optical microscopy (deprecated) (see 3.36)
BEEM	ballistic-electron emission microscopy (see 5.8)
BEES	ballistic-electron emission spectroscopy (see 5.8)
CFM	chemical-force microscopy (see 3.3)
CITS	current-imaging tunnelling spectroscopy (see 3.5)
CPAFM	conductive-probe atomic-force microscopy (see 3.4)
CRAFM	contact resonance atomic-force microscopy (see 6.4)
CRFM	contact resonance force microscopy (see 6.4)
DFM	dynamic-force microscopy (see 3.6)
DMM	displacement modulation microscopy
DTM	differential-tunnelling microscopy
EC-AFM	electrochemical atomic-force microscopy (see 3.8)
ECFM	electrochemical-force microscopy
EC-SPM	electrochemical scanning-probe microscopy
EC-STM	electrochemical scanning tunnelling microscopy (see 3.9)