
**Surface chemical analysis — Analysis
of metallic nanolayers on iron based
substrates by glow-discharge optical-
emission spectrometry**

*Analyse chimique des surfaces — Analyse des nanocouches
métalliques sur des substrats à base de fer par spectrométrie
d'émission optique à décharge lumineuse*



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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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 201, *Surface chemical analysis*, Subcommittee SC 8, *Glow discharge spectroscopy*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Surface chemical analysis — Analysis of metallic nanolayers on iron based substrates by glow-discharge optical-emission spectrometry

1 Scope

This document specifies a glow discharge optical emission spectrometric method for the determination of the thickness and mass per unit area of single and metallic nanolayers on iron-based substrates.

This method is applicable to single and metallic nanolayers, 10 nm to 100 nm thick, on iron-based substrates. The metallic elements of the layers are Cr, Ni, Ti, Mn and Al. Other elements that can be determined according to this document are P and S.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition*

ISO 14707, *Surface chemical analysis — Glow discharge optical emission spectrometry (GD-OES) — Introduction to use*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principle

The analytical method described here involves the following processes:

- a) preparation of the sample to be analysed, generally in the form of a flat plate or disc of dimensions appropriate to the instrument or analytical requirement (round or rectangular samples with a width of more than 10 mm, generally 20 mm to 100 mm, are suitable);
- b) cathodic sputtering of the surface coating in a direct current or radio frequency glow discharge device;
- c) excitation of the analyte atoms in the plasma formed in the glow discharge device;
- d) spectrometric measurement of the intensities of characteristic spectral emission lines of the analyte atoms and ions as a function of sputtering time (qualitative depth profile);
- e) conversion of the depth profile in units of intensity versus time to mass fraction versus depth by means of calibration functions (quantification). Calibration of the system is achieved by