
**Nanotechnologies — Characterization of
single-wall carbon nanotubes using
ultraviolet-visible-near infrared
(UV-Vis-NIR) absorption spectroscopy**

*Nanotechnologies — Caractérisation des nanotubes à simple couche
de carbone par utilisation de la spectroscopie d'absorption UV-Vis-NIR*



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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.

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1 Scope

This Technical Specification provides guidelines for the characterization of compounds containing single-wall carbon nanotubes (SWCNTs), using optical absorption spectroscopy.

The purpose of this Technical Specification is to describe a measurement method for establishing the diameter, purity, and ratio of metallic SWCNTs to the total SWCNT content in the sample.

The analysis of the diameter is applicable to a diameter range of 1 nm to 2 nm.

2 Normative references

The following referenced documents are indispensable for the application 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/TS 80004-3, *Nanotechnologies — Vocabulary — Part 3: Carbon nano-objects*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in ISO/TS 80004-3 and the following apply.

3.1 Terms and definitions

3.1.1

purity indicator

optically defined indicator of the ratio of the mass fraction of SWCNTs to the total carbonaceous content in a sample

NOTE Purity indicator is not “purity” itself, which is defined as the percentage of mass of SWCNTs to the total mass of the sample. This guideline cannot evaluate this general purity, because absorption spectroscopy cannot detect metallic impurities that are generally contained in any SWCNT sample. In order to characterize metal impurity content, see ISO/TS 11308, which addresses thermogravimetric analysis.

3.1.2

ratio of metallic SWCNTs

optically defined compositional ratio of metallic SWCNTs to the total SWCNTs contained in the sample