
**Nanotechnologies — Characterization of
single-wall carbon nanotubes using near
infrared photoluminescence
spectroscopy**

*Nanotechnologies — Caractérisation de nanotubes de carbone
monofeuillet en utilisant la spectroscopie de photoluminescence dans le
proche infra-rouge*



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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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Introduction

Discovery of band gap photoluminescence (PL) of single-wall carbon nanotubes (SWCNTs) has provided a new way to characterize their unique electronic properties induced by their low dimensionality. The method can provide the chiral indices of the semi-conducting SWCNTs in a sample and their relative integrated PL intensities. With the knowledge of their PL cross-sections, the relative mass concentrations of semi-conducting SWCNTs in a sample can be estimated.

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Nanotechnologies — Characterization of single-wall carbon nanotubes using near infrared photoluminescence spectroscopy

1 Scope

This Technical Specification provides guidelines for the characterization of single-wall carbon nanotubes (SWCNTs) using near infrared (NIR) photoluminescence (PL) spectroscopy.

This Technical Specification provides a measurement method for the determination of the chiral indices of the semi-conducting SWCNT in a sample and their relative integrated PL intensities.

The method can be expanded to estimate relative mass concentrations of semi-conducting SWCNTs in a sample from measured integrated PL intensities and knowledge of their PL cross-sections.

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 and definitions

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

3.1

chiral vector of SWCNT

vector notation used to describe the helical structure of a single-wall carbon nanotube

[ISO/TS 80004-3:2010, definition 4.5]

3.2

chiral indices

two integers that define the chiral vector of a single-wall carbon nanotube

3.3

relative mass concentration

mass concentration of nanotube species relative to that of the most common nanotube species