TECHNICAL SPECIFICATION

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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

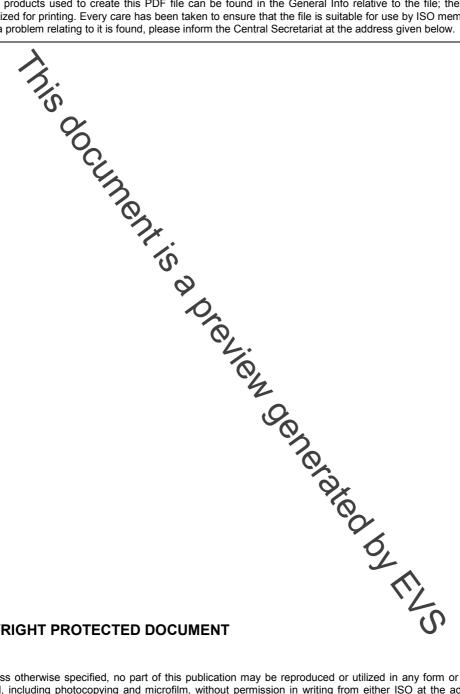


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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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ISO/TS 10867 was prepared by Technical Committee ISO/TC 229, Nanotechnologies.

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-

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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 indipensable for the application of this document. For dated references, only the edition cited applies. For indated 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 it 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 danotube

[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