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

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## Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the translation method equivalent to ISO /T S10868.2017

“Nanotechnology single-wall carbon nanotubes UV/visible/near infrared

Absorption spectrum characterization method”.

The Chinese documents that have a consistent correspondence with the international documents cited in this standard are as follows.

GB/T 30544.4-2019 Nanotechnology terminology Part 4.Nanostructured materials (ISO /T S80004-4.2011, IDT)

This standard has made the following editorial changes.

---Adjust the sorting of references.

This standard was proposed by the Chinese Academy of Sciences.

This standard is under the jurisdiction of the National Nanotechnology Standardization Technical Committee (SAC/TC279).

Drafting organizations of this standard. National Nanoscience Center, Institute of Physics, Chinese Academy of Sciences.

## 1 Scope

This standard provides guidelines for characterizing single-walled carbon nanotubes (SWCNTs) in mixtures using optical absorption spectroscopy.

This standard is applicable to the measurement of sample diameter, purity and the mass fraction of metallic SWCNTs in total SWCNTs.

When used for nanotube diameter analysis, the applicable diameter range is 1nm~2nm.

## 2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article

Pieces. For undated references, the latest version (including all amendments) applies to this document.

ISO /T S80004-4 Nanotechnology terminology Part 4.Nanostructured materials

### 3.1 Terms and definitions

ISO /T S80004-4 and the following terms and definitions apply to this document.

### 3.1.1

#### Purity index

The ratio of SWCNTs to the total carbon mass fraction in the sample defined by the optical method.

Note. The purity index is not the "purity" itself which is usually defined as the percentage of SWCNTs in the total mass of the sample. Cannot be detected due to absorption spectroscopy

The metal impurities of SWCNT samples, so this standard is not used to assess conventional purity. The metal impurity content can be determined by the international technical specification of thermogravimetric analysis

Characterization. Metal impurities are defined as catalyst metal particles, excluding metallic carbon nanotubes. See ISO /T S11308.

### 3.1.2

#### Metallic SWCNTs ratio

The composition ratio of metallic SWCNTs defined by the optical method to the total SWCNTs in the sample.

## 3.2 Abbreviations

The following abbreviations apply to this document.

CMC. Sodium carboxymethyl cellulose

DMF. Dimethylformamide

DOS. density of states

NIR. Near infrared

NMP. N-methyl-2-pyrrolidone

SC. Sodium Cholate

DOC. Sodium deoxycholate

SDS. Sodium Lauryl Sulfate

SDBS. Sodium Dodecylbenzene Sulfonate