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Nanotechnologies — Considerations for the measurement of nano-objects and their aggregates and agglomerates (NOAA) in environmental matrices

Nanotechnologies — Considérations pour la mesure des nano-objets, et leurs agrégats et agglomérats (NOAA) dans les matrices environnementales

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Contents

Page

Foreword ... **iv**

Introduction ... **v**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**

4 Symbols and abbreviated terms ... **3**

5 General considerations ... **3**
5.1 General ... 3
5.2 Considerations for determining background levels of NM ... 4
5.3 Distribution of NM in the environment ... 4
5.4 Interaction with materials in environmental matrices ... 5
5.5 Real-time measurements versus integrated versus spot sampling ... 7
5.6 Preparing samples for analysis ... 8
5.7 Characterization and quantitation of NOAA ... 8

6 Considerations for sampling and analysing NOAA in air ... **8**
6.1 General considerations ... 8
6.2 Transformations and dispersion in the environment ... 9
6.3 Sampling considerations ... 9
6.4 Preparation for analysis ... 9
6.5 Detection and quantitation ... 9

7 Considerations for sampling and analysing NOAA in surface water ... **10**
7.1 General ... 10
7.2 Transformations and dispersion in the environment ... 10
7.3 Sampling considerations ... 10
7.4 Preparation for analysis ... 11
7.5 Detection and quantitation ... 11
7.5.1 Metal NM ... 11
7.5.2 Metal oxide NM ... 12
7.5.3 Carbon-based NM ... 12

8 Considerations for sampling and analysing NOAA in sea water ... **12**
8.1 Transformations and interaction with materials in the environment ... 12
8.2 Sampling considerations ... 12
8.3 Preparation for analysis ... 13
8.4 Detection and quantitation ... 13

9 Considerations for sampling and analysing NOAA in sediment ... **13**
9.1 Transformations and interaction with materials in the environment ... 13
9.2 Sampling considerations ... 13
9.3 Preparation for analysis ... 14
9.4 Detection and quantitation ... 14

10 Considerations for sampling and analysing NOAA in soil ... **14**
10.1 Transformations and interaction with materials in the environment ... 14
10.2 Sampling considerations ... 15
10.3 Preparation for analysis ... 15
10.4 Detection and quantitation ... 15

Annex A (informative) **Instrumentation/techniques used to quantify and characterize NOAA** ... **16**

Bibliography ... **23**

Foreword

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This document was prepared by Technical Committee ISO/TC 229, *Nanotechnologies*.

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.

Introduction

There is an interest in determining the concentration of nano-objects and their aggregates and agglomerates (NOAA) in environmental matrices. Manufactured nanomaterials (NM) enter the environment via release from the manufacturing process and its waste streams, as well as via the use of commercial products and their recycle and disposal streams. Such measurement efforts require an understanding of the occurrence of natural materials that can interfere with the analysis or skew the results, knowledge of how the environment can interact with NM, and insights that require unique collection and analytical techniques specific to the composition of the particle. This document provides a review of published studies that report levels of NOAA in the environment and aspects of collection and sample preparation. The reader is also directed to the Further Reading section of this document for information regarding ISO guidance on sampling of air, water, and sediment, as well as a matrix of measurement techniques.

Not all manufactured NM are discussed here because there might not yet be published studies that examined them in the environment. On the other hand, collection methods and pre-analytical procedures might be similar for some or all NOAA in a given environmental matrix. Furthermore, NOAA isolated from the environment can be characterized using the same instruments and analytical techniques used for pristine NOAA. Thus, the lack of published studies does not preclude the ability to collect a specific NM from any environmental matrix and measure the NOAA present.

Although it is recognized that biota (i.e. living organisms) also can interact with NM by sequestering and/or transforming them, analysis of biota is intentionally excluded so that the scope of this Document does not become too broad. However, the impact of biota should not be overlooked. Such considerations could be part of a subsequent Technical Report.

Furthermore, when NM are used for environmental remediation, and there is interest in measuring residual levels of remediating NM after the environmental medium has been processed. It is anticipated that the considerations described here would be applicable to those investigations.

The audience for this document is expected to be scientists from the regulatory, academic, or industrial communities who wish to answer the question of how much manufactured NM is present in a specific environmental medium. The results could be used for environmental stewardship, for risk assessment, or to calibrate modelled exposure estimates, although these applications are not discussed here.

NOTE The term NM refers to the identity of the nanomaterial, whereas NOAA is a more inclusive term encompassing NM and aggregates that are the focus of the analyses described here.