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Nanotechnologies — Carbon nanotube suspensions — Specification of characteristics and measurement methods

Nanotechnologies — Suspensions de nanotube de carbone — Spécification de caractéristiques et méthodes d'essais

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Foreword

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

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Introduction

Carbon nanotubes (CNT) have attracted great interest due to their wide scope of possible applications, such as composite reinforcement material, hydrogen containers, super-capacitors, molecular sensors and scanning probe tips. Offering attractive mechanical, electric and thermal properties, CNTs could achieve a significant improvement in bulk properties by adding low weight percentages.

The performance of nano-objects can be degraded with the formation of agglomerates or aggregates in post-processing. Suspensions of the appropriate fluids and additives will stabilize nano-objects, preventing agglomeration and reducing losses to the environment during handling. It is widespread practice in the manufacturing industry to pre-treat nano-objects by making suspensions before delivery to the downstream customers. Industrial products based on CNT suspensions are a good example.

Since CNT suspensions containing multi-walled carbon nanotubes (MWCNTs) are widely supplied nowadays, it is timely to develop appropriate specifications. Such specifications would facilitate the communication between interested parties and the commercialization of CNT suspensions, and help to generate consistent performance in the final products.

A number of characterization documents related to CNT have been developed by ISO/TC 229, in which measurement methods and procedures for characteristics including morphology, impurities, volatile components, etc. are specified. This document specifies the characteristics to be measured of CNT suspension samples and describes their measurement methods. ISO/TR 10929 describes the characteristics to be measured of bulk samples of MWCNTs and their measurement methods. ISO/TR 13097 provides guidelines on how to characterize the stability of suspensions. It includes general guidance on how to specify the suspension in terms of its physical and chemical characteristics, which might affect its performance or subsequent processing.