ANSI-NSP Newsletter

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The ANSI-NSP Newsletter provides information on nanotechnology standards and related topics of interest. Stakeholders are encouraged to submit information to the ANSI-NSP that they feel would be of interest to the larger ANSI-NSP Community.

While ANSI will be providing some of the content to be included in this newsletter, this is a community-driven project, with developers and organizations providing updates on any documents published or upcoming meetings that may be of interest to the ANSI-NSP. If you do have any information you would like to share, please feel free to forward it to hbenko@ansi.org.

For further information and updates on the Panel, please visit the ANSI-NSP Website.

WELCOME

One of the most common recommendations we hear from standards development organizations (SDOs) involved in nanotechnology efforts is the need for greater visibility of existing and in-development nanomaterials and nanotechnology guidance documents, reference materials, and standards. Such visibility not only increases the utilization of those standards already developed, but can also be an outreach mechanism to solicit participation and input from affected parties.

In 2013, to promote the efforts of our members, ANSI launched the Nanotechnology Standards Database: nanostandards.ansi.org. This database is an openly-available, community-driven project,

providing SDOs and other relevant organizations a forum for promoting their existing documents as well as those projects underway. As of June 20, the database contains approximately 152 standards, guidance documents, protocols and other deliverables from domestic and international bodies. The database also includes direct links to various standards activities such as ASTM E56, IEC TC 113, and TAPPI's International Nanotechnology Division.

It is our hope that this database not only provides a vehicle for organizations to promote their efforts, but also increases community awareness of the resources already available to them.

Interested in promoting your organization's efforts in the Newsletter or being our guest columnist for an upcoming edition? Please contact Heather Benko (hbenko@ansi.org, 212.642.4912) for more information.

NEWS & INFORMATION

ASTM E56 Committee on Nanotechnology

The spring meeting of ASTM International's Committee E56 on Nanotechnology was held in San Antonio, Texas on May 2-3, 2016. At this meeting, the E56 Executive Committee voted and approved Fred Klaessig from Pennsylvania Nano Bio Systems as the Chair of Subcommittee E56.01 on Informatics and Terminology. The meeting was well attended by members from federal agencies, including four nanotechnology experts from FDA and one from NRC Canada, as well as members from industry and academia.

New proposed standards in various stages of development were discussed in four of the five technical subcommittee meetings. These proposed standards and technical contacts are:

(1) *New Standard Guide for the Analysis of Nanoparticles by Single Particle Inductively Coupled Plasma Mass Spectrometry (SP-ICP-MS)*, Stan Smith, Perkin-Elmer
(2) *New Standard Practice for Performing Electron Cryo-Microscopy of Liposomes*, Angel Paredes, FDA
(3) *New Standard Guide for Collection and Generation of Environment, Health, and Safety Information for Nanomaterials and Nanoenabled Products*, Alan Kennedy, US Army Corps of Engineers
(4) *New Test Method for Detection of Total Silver in Textiles by ICP Analysis,* Aleksandr Stefaniak, NIOSH
(5) *New Standard Guide for Nanotechnology Workforce Education in Materials Synthesis and Processing*, Robert Ehrmann, The Pennsylvania State University
(6) *New Standard Guide for Nanotechnology Workforce Education in Material Properties and Scale*, Robert Ehrmann, The Pennsylvania State University

The next meeting of ASTM E56 will be held on November 14-15, 2016 at the Renaissance Orlando at SeaWorld in Orlando, Florida. For more information, contact Kate Chalfin at kchalfin@astm.org.

IEC TC 113 Nanotechnology for electrotechnical products and systems

IEC TC 113 recently held a Plenary and Working Group meetings in Lowell, Massachusetts, in May 2016. In

attendance was the new Chair of IEC/TC 113 – Dr. Akira Ono of Japan. Below are items currently under consideration by this IEC Technical Committee:

Awaiting publication:

IEC/TS 62607-3-2: Nanomanufacturing - Key control characteristics - Part 3-2: Luminescent nanoparticles - Determination of mass of quantum dot dispersion

This TS, a USNC-led project, specifies a method for determining the mass of a sample of QD dispersion after the removal of impurities and surfactant ligands through heating at high temperatures.

IEC/TS 62607-4-2 Nanomanufacturing - Key control characteristics - Part 4-2: Nano-enabled energy storage - Physical characterization of nanomaterials, density measurement

This TS establishes a measurement method for determining the density of cathode nanomaterials, which is critical to the performance of power type electronic energy storage devices. At an appropriate density, the electrochemical performance, such as low-temperature and high-temperature charge/discharge, and the ratio of charge/discharge capability, is dramatically increased

IEC/TS 62607-4-4 Nanomanufacturing - Key control characteristics - Part 4-4 Nano-enabled electrical energy storage devices - Thermal characterization of nanomaterials, nail penetration method

This TS establishes a method for determining the effectiveness of nano material additives in nano-enabled energy storage devices in preventing thermal runaway and maintaining device reliability and safety of energy storage devices in abnormal conditions such as quick charging or piercing from external objects.

IEC/TS 62607-6-4: Nanomanufacturing - Key control characteristics - Part 6-4: Graphene - Conductance measurements using resonant cavity

This TS, a USNC-led project, establishes a non-contact method for determining the surface conductance of 2D single-layer or multi-layer atomically thin nano-carbon graphene structures. The Draft Technical Specification was approved by National Committee vote in March, 2016 and comments were resolved at the TC 113 WG8 meeting held May 11, 2016 in Lowell, MA.

IEC/TS 62844: Guidelines for quality and risk assessment for nano-enabled electrotechnical products

This TS provides a recommended methodology for identifying relevant parameters of nanomaterials and generic guidelines on implementation of quality assessment and environment/health/safety assessment for nano-enabled/nano-enhanced electrotechnical products.

In development:

IEC 62565-3-1: Nanomanufacturing - Material specifications - Part 3-1: Graphene - Blank detail specification

This standard, a USNC-led project, will establish a blank detail specification and format for listing essential electrical and certain other characteristics including optical, dimensional, and mechanical properties of single and few layer and functionalized graphene for use in electrotechnical applications. Circulation of a third Committee Draft is planned.

IEC/TS 62565-4-2: Nanomanufacturing - Material specifications - Part 4-2: Luminescent nanomaterials - Detail specification for general lighting and display applications

This TS, a USNC-led project, specifies the essential general and optical requirements of monodisperse luminescent nanomaterials used in general lighting and display products to enable their reliable mass

production and quality control during the manufacturing process. Resolutions to comments in response to the Committee Draft were recorded at the May 12, 2016 TC 113/WG 10 meeting in Lowell, MA. The Committee Draft for Vote (CDV) will be circulated this summer.

IEC/TS 62607-6-3: Nanomanufacturing - Key control characteristics - Part 6-3: Graphene - Characterization of graphene domains and defects

This approved work item is a TS that provides the evaluation method of determining graphene domains and defects in order to understand the effect of graphene domain size and distribution of defects on properties of graphene, and enhancing the performance of high speed, flexible, and transparent devices using CVD graphene. TC 113 is awaiting circulation of the first Committee Draft.

IEC/TS 80004-9: Nanotechnologies - Vocabulary - Part 9: Nano-enabled electrotechnical products and systems

This TS provides terms and definitions for electrotechnical products and systems that are reliant on nanomaterials for their essential functionalities. It is intended to facilitate communications between organizations and individuals in industry and those who interact with them. The Draft Technical Specification is out for National Committee voting until July 8, 2016.

To be proposed:

IEC/TS 62565-3-2: Material specifications - Part 3-2: Graphene - Detail specification for nano-inks

A New Work Item Proposal for this TS, led by Canada, will specify the essential general and electrical requirements for graphene-based inks

IEC/TS 62607-6-3: Nanomanufacturing - Key control characteristics - Part 6-2: Graphene – Evaluation of the number of layers of graphene

This TS will establish a method for measuring the number of layers of mechanically exfoliated graphene using multiple methods so as to overcome weak points associated with using a single method.

IEC/TS 62607-6-5: Nanomanufacturing - Key control characteristics - Part 6-2: Graphene – Sheet resistance and contact resistance measurement of two-dimensional materials using the transmission line method

A presentation was made during the TC 113/WG 8 meeting in Lowell, MA describing the basic concepts behind this key control characteristic. A New Work Item Proposal is expected to be circulated this year.

The next meetings of IEC TC 113 and its Working Groups will take place October 12 – 15, 2016, in Frankfurt, Germany, in conjunction with the International Electrotechnical Commission's (IEC) General Meeting

ISO/TC 229 Recent Publications and approved work items

ISO has recently published the following deliverables developed under ISO/TC 229 *Nanotechnologies*:

- **ISO/TS 19937** ***Nanotechnologies -- Characteristics of working suspensions of nano-objects for in vitro assays to evaluate inherent nano-object toxicity***, describes characteristics of working suspensions of nano-objects to be considered when conducting *in vitro* assays to evaluate inherent

nano-object toxicity. This TS, which is applicable to nano-objects, and their aggregates and agglomerates greater than 100 nm (NOAA) also identifies applicable measurement methods for these characteristics. It is intended to help clarify whether observed toxic effects come from tested nano-objects themselves or from other uncontrolled sources.

- **ISO/TR 19716** ***Nanotechnologies – Characterization of cellulose nanocrystals,*** reviews commonly used methods for the characterization of cellulose nanocrystals (CNCs), including sample preparation, measurement methods and data analysis. Selected measurands for characterization of CNCs for commercial production and applications are covered. These include CNC composition, morphology and surface characteristics.

More information regarding the documents above, or any published ISO Standards or other deliverables, can be reviewed after publication using the ISO Online Browsing Platform (https://www.iso.org/obp/ui/). All ISO published documents are available for purchase via ANSI's Webstore.

ISO/TC 229 has recently added the following projects to their work programme:

- **ISO/AWI TR 21386 --** ***Nanotechnologies -- Considerations for the measurement of nano-objects, and their aggregates and agglomerates (NOAA) in the environment*** *(under development by WG 3, Health, safety and environment)*
- **ISO/AWI TS 21412 --** ***Nanotechnologies -- Nanostructured layers for enhanced electrochemical bio-sensing applications -- Characteristics and measurements (****under development by WG 4, Materials specifications)*

More information regarding the two work items above, or any other work items included in ISO/TC 229's work programme is available to U.S. stakeholders, by contacting Heather Benko at hbenko@ansi.org; others should contact your country's ISO Member Body

The next meeting of ISO/TC 229 and its Working Groups will take place November 7-11, 2016, in Singapore.

The American National Standards Institute's Nanotechnology Standards Panel (ANSI-NSP) serves as the cross-sector coordinating body for the purposes of facilitating the development of standards in the area of nanotechnology, including, but not limited to: nomenclature/terminology; health, safety and environmental aspects; materials properties; and testing, measurement, and characterization procedures.

For more information about the NSP, please contact hbenko@ansi.org