

ASTM International Committee E56 on Nanotechnology

E56 on Nanotechnology



<http://www.astm.org/COMMIT/COMMITTEE/E56.htm>

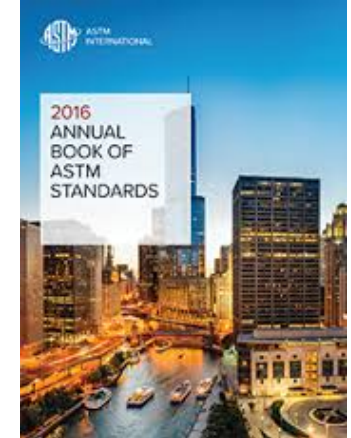
Debra L. Kaiser
Material Measurement Laboratory, NIST
Vice-Chair, Committee E56



ANSI Nanotechnology Standards Panel Meeting
February 28, 2017

ASTM International

- Established in 1898
- Standards for manufacturing and materials, products and processing, systems and services
- Approximately 145 Technical Committees
- Standards conform to all criteria for international standards
- Harnessing the expertise of over 30,000 members
 - Over 9,000 international members
 - From over 140 countries



- 12,671 standards operate globally
- Over 50% standards sold outside of U.S.
- 1,000 MOUs
- 6,733 ASTM Standards cited by 75 nations



ASTM E56 Overview

Overview

- Established in 2005
- Membership: 178 individuals and organizations
- 22 countries represented in membership
- Committee meets twice yearly (May and November)



Scope

- Develop standards and guidance for nanotechnology and nanomaterials
- Coordinate with existing ASTM standardization efforts of other ASTM committees as they relate to nanotechnology
- Maintain appropriate global liaison relationships with activities (internal and external) related to this subject area
- Participate in the development of symposia, workshops, and other related activities to enhance the development of standards



E56 Organization

Chair: *Stacey Harper* (Oregon State)

Vice-Chair: *Debbie Kaiser* (NIST)

ASTM Staff Manager: *Kate McClung*

Membership Secretary: *Aleksandr Stefaniak* (NIOSH)

Secretary: *Tony Thornton* (Micromeritics)

Technical Subcommittees

E56.01

Informatics and
Terminology

E56.02

Physical and Chemical
Characterization

E56.03

Environment,
Health, and Safety

E56.06

Nano-enabled
Consumer Products

E56.07

Education and Workforce
Development

E56.08

Nano-enabled
Medical Products

E56.04

Intellectual Property Issues

E56.05

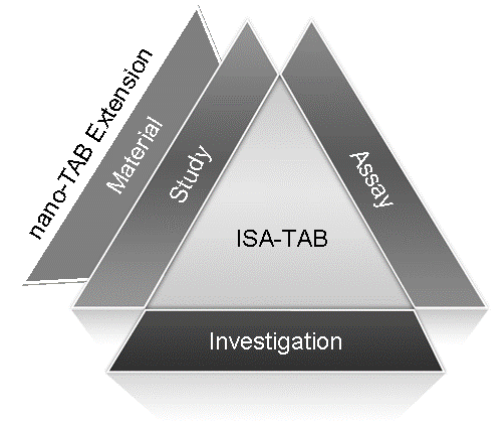
Liaison and Int'l Cooperation

Advisory Subcommittees



E56 Published Standards

- Informatics and Terminology: 2
- Physical and Chemical Characterization: 6
- Environment, Health, and Safety: 4
- Nano-Enabled Consumer Products: 1
- Education and Workforce Development: 5



Basic Skill Set Standards for Education and Workforce Development

- Provide a framework for basic nanotechnology workforce education by academic institutions
- Develop or evaluate education programs in the nanotechnology field

Published Standards

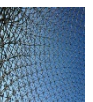
E2996 Standard Guide for Workforce Education in Nanotechnology Health and Safety

E3001 Standard Practice for Workforce Education in Nanotechnology Characterization

E3034 Standard Guide for Workforce Education in Nanotechnology Pattern Generation

E3059 Standard Guide for Workforce Education in Nanotechnology Infrastructure

E3071 Standard Guide for Nano-Technology Workforce Education in Materials Synthesis and Processing



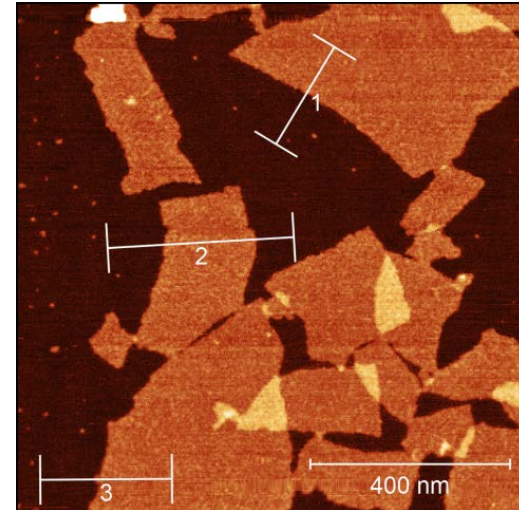
New Work Item on Graphene

WK 56764: New Standard Guide for Characterization of Graphene Flakes Produced by Exfoliation

Scope: This standard will cover the measurement approaches for assessment of **lateral flake size, average flake thickness, Raman intensity ratio of the D to G bands, and carbon/oxygen ratio** for graphene and related products made of exfoliation. The techniques used are **atomic force microscopy, Raman spectroscopy and X-ray photoelectron spectroscopy methods.**

Technical Contact: Shan Zou, NRC Canada

Status: Draft in progress



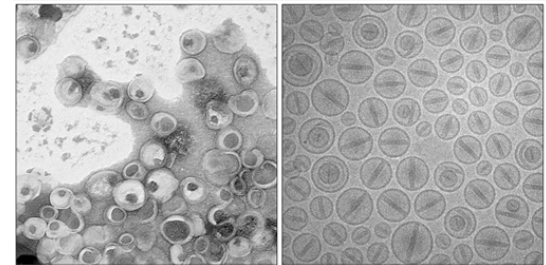
Other New Work Items

WK 54615: New Standard Practice for Performing Electron Cryo-Microscopy of Liposomes

Scope: This practice covers procedures for preparing and recording images of suspensions of liposomes for the purpose of evaluating their **shape and size distribution for quality assessment**. The sample is to be imaged in a cryo-holder placed in a **cryo-capable electron microscope**.

Technical Contact: Angel Paredes, FDA

Status: Second draft out for comments on collaboration area



Liposomes make up ~26% of nano-related drug submissions.

WK 54613: New Standard Guide for the Analysis of Nanoparticles by Single Particle Inductively Coupled Plasma Mass Spectrometry (SP-ICP-MS)

Scope: This guide covers information on the **optimization, calibration, and operational guidance** for Inductively Coupled Plasma Mass Spectrometers (ICP-MS) for the analysis of nanoparticles containing metallic elements in various matrices by the technique of SP-ICP-MS.

Technical Contact: Stan Smith, Perkin-Elmer

Status: Second draft out for comments on collaboration area



Other New Work Items

WK 54872: New Standard Test Method for Measuring the Size of Nanoparticles in Aqueous Media Using Batch-Mode Dynamic Light Scattering

Scope: This test method addresses the determination of **mean nanoparticle size** (sphere equivalent hydrodynamic diameter) using batch-mode dynamic light scattering (DLS) in dilute aqueous suspensions. The standard is needed to facilitate **regulatory review** and oversight of nanoparticle-based biomedical products.

Technical Contact: Vincent Hackley, NIST (partnership with FDA)

Status: First draft under revision per comments

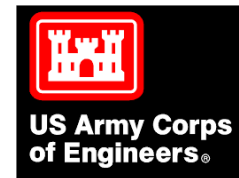


WK 48313: New Standard Guide for Collection and Generation of Environment, Health, and Safety Information for Nanomaterials and Nanoenabled Products

Scope: This guide provides a consistent **process for generating environmental health and safety (EHS) information** for nanomaterials and nano-enabled products, including consideration of their relevant structure and use. It is a **5-tiered guidance framework** for assessing whether nano-enabled products and nanomaterials have the **potential for release of nano-scale materials**, how they will behave in natural systems, and whether they pose EHS concerns.

Technical Contact: Alan Kennedy, US Army Corps of Engineers

Status: First draft out for comments on collaboration area



Other New Work Items

WK 52417: New Standard Test Method for Detection of Total Silver in Textiles by ICP Analysis

Scope: This method specifies two methods for preparing test solutions from samples of textiles for analysis of silver using ICP: (1) acid-assisted digestion followed by external calibration with **ICP-optical emission spectrometry (ICP-OES) or ICP-mass spectrometry (ICP-MS) analysis** to measure silver; and (2) acid-assisted digestion followed by **isotope dilution analysis with ICP-MS (IDA-ICP-MS) analysis** to measure silver.

Technical Contact: Aleksandr Stefaniak, NIOSH

Status: Second draft out for comments on collaboration area



WK 56677: New Standard Guide for Nanotechnology Workforce Education in Material Properties and Effects of Size

Scope: The goal is to define a set of foundational standards for nanotechnology workforce education at the undergraduate level, so as to **guide uniformity in the qualifications of graduates** from such educational programs to meet both industry and academic needs.

Technical Contact: Robert Ehrmann, Penn State

Status: Draft in progress



In Closing...

ASTM E56 welcomes any individual or organization that wishes to participate in E56's development of nanotechnology and nanomaterial standards

Next Meeting: May 8-9, 2017 in Toronto, Canada

Annual fee to join ASTM is \$75/year

E56 on Nanotechnology



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