NIST National Institute of Standards and Technology U.S. Department of Commerce

SRM SPOTLIGHT

February 2017

Inside:
New SRMs/RMs

NIST SRM Exhibits

The identification of any commercial product or trade name does not imply endorsement or recommendation by the National Institute of Standards and Technology.

Editor:
Regina R. Montgomery

NIST SRM 2082 Pathlength Absorbance Standards for Microliter Volume Spectrophotometers

The determination of the concentrations of DNA, RNA, and proteins based on absorbance is one of the most frequently used measurements in biological laboratories. A new generation of spectrophotometers use short pathlengths and microliter volumes to conserve precious samples. SRM 2082 was designed to provide a rapid and convenient method to verify the pathlength in the UV-range using materials that have similar absorbance characteristics to nucleic acids and proteins. The selection criteria for the materials are that the spectral properties should be similar to nucleic acids and proteins and the solutions had to be stable. Uracil and tryptophan met these criteria. Uracil is one of the bases found in RNA and has an absorbance spectrum (peak at 260 nm) that is similar to those of RNA and DNA. The amino acid tryptophan is one of the twenty amino acids naturally occurring in proteins and is the amino acid mainly responsible for the characteristic absorbance of proteins (peak at 280 nm). A set of calibrated short pathlength cuvettes was used to determine the absorbances of the components. The effect of temperature and spectral bandwidth on the absorbance values was also measured. The stability was shown by repeated measurements over 2 years.

Technical Contact: Kenneth Cole
Email: kenneth.cole@nist.gov

https://www-s.nist.gov/srmors/view_detail.cfm?srm=2082

NIST SRM 3060 Monoester Phthalates in Acetonitrile

The Centers for Disease Control and Prevention (CDC) have been monitoring monoester phthalates in human urine samples as part of the National Health and Nutrition Examination Survey (NHANES) since NHANES 1999-2000. Several years of NHANES data had to be revised recently due to a purity issue with several monoester phthalates. After spending a considerable amount of time and money revising monoester phthalate data, in 2012, CDC approached NIST and asked if NIST would consider developing a solution SRM for monoester phthalates. To this end, NIST decided to prepare a solution of 13 monoester phthalates with relative concentrations similar to those observed in urine by NHANES. NIST developed SRM 3060 Monoester Phthalates in Acetonitrile. This solution is an assemblage of the most frequently detected monoester phthalates in urine and is intended to be used in the validation of existing methods or for use as a calibration mixture in routine analysis.

Technical Contact: Jessica Reiner
Email: jessica.reiner@nist.gov

https://www-s.nist.gov/srmors/view_detail.cfm?srm=3060

NIST SRM 3222 Cigarette Tobacco Filler

The National Institute of Standards and Technology has collaborated with the Food and Drug Administration, Center for Tobacco Products (FDA CTP) to develop a Standard Reference Material (SRM) to support the analysis of tobacco products. SRM 3222 Cigarette Tobacco Filler was prepared from air-cured very low nicotine tobacco that was processed using normal procedures for the production of cigarette tobacco filler. The resulting material consists of dried and chopped leaves, referred to as “cut rag”, with 30 cuts per inch. This SRM is intended primarily for use in evaluating the accuracy of procedures for the determination of nicotine, tobacco specific nitrosamines (TSNAs), N-nitrosonornicotine (NNN), and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK), and moisture in tobacco. It is also intended for use in validating working or secondary reference materials. A unit of SRM 3222 consists of 20 jars, each containing approximately 10 g of cigarette tobacco filler.

Technical Contact: Lane Sander
Email: lane.sander@nist.gov

https://www-s.nist.gov/srmors/view_detail.cfm?srm=3222

NIST SRM 3600 Absolute Intensity Calibration Standard for Small-Angle X-Ray Scattering

Standard Reference Material (SRM) 3600 Absolute Intensity Calibration Standard for Small-Angle X-Ray Scattering is intended for use in the scattering intensity calibration of small-angle X-ray scattering (SAXS) instruments. Absolute intensity calibration of SAXS data is a critical requirement for the quantitative determination by SAXS of volume fraction (or porosity) and surface area information for nanoscale and mesoscale structures within advanced technological materials. Frequently, it is such details of the microstructure that determine the key properties of the material, and hence its performance in an application. Direct measurement of the SAXS scattering probability of a given sample material requires absolute calibration of the weak scattered beam intensity relative to that of the incident beam. This requires a linear detector response to X-ray intensity over a very large dynamic range. In contrast, SRM 3600 provides a convenient intensity calibration through comparison of the normalized scattering intensities measured for the sample and the standard.

SRM 3600 is intended for use in materials microstructure characterization, as well as for quality assurance and establishing traceability when assigning values such as volume concentration or internal surface area to a broad range of heterogeneous materials of technological importance, including (but not limited to) precipitate formation in metals and alloys, sintered morphologies in functional ceramics, nanoparticle suspensions for biomedical applications or otherwise important to the environment and health, porous catalysts and sorbents, new polymer processing, and protein folding relevant to new drug development. A unit of SRM 3600 consists of one glassy carbon coupon of approximate dimensions 10 mm x 10 mm x 1 mm (thick), supplied in a plastic membrane box, together with a certified intensity calibration curve.

Technical Contact: Andrew Allen
Email: andrew.allen@nist.gov

https://www-s.nist.gov/srmors/view_detail.cfm?srm=3600

NIST RM 8375 Microbial Genomic DNA Standards for Sequencing Performance Assessment

NIST RM 8391 Human DNA for Whole-Genome Variant Assessment (Son of Eastern European Ashkenazim Jewish Ancestry)

NIST RM 8392 Human DNA for Whole-Genome Variant Assessment (Trio of Eastern European Ashkenazim Jewish Ancestry)

NIST RM 8393 Human DNA for Whole-Genome Variant Assessment (Son of Chinese Ancestry)

In September 2016, NIST released four new human and microbial whole genome reference materials characterized by NIST and the Genome in a Bottle Consortium (GIAB). GIAB is a public-private-academic consortium hosted by NIST and the Joint Initiative for Metrology in Biology (JIMB, http://jimb.stanford.edu), a collaboration between NIST and Stanford University, to develop the technical infrastructure (reference standards, reference methods, and reference data) to enable translation of whole human genome sequencing to clinical practice. GIAB has authoritatively characterized human genome Reference Materials for use in analytical validation and technology development, optimization, and demonstration. In 2015, NIST released the pilot genome Reference Material 8398, which is genomic DNA derived from a large batch of a cell line and characterized for high-confidence small variant and homozygous reference regions (Zook, et al., Nature Biotechnology 2014).

There are four new GIAB reference materials available. With the addition of these new reference materials (RMs) to a growing collection of "measuring sticks" for genome sequencing, we can now provide laboratories with even more capability to accurately sequence DNA for genetic testing, medical diagnoses, and future customized drug therapies. The new tools feature sequenced genes from individuals in two genetically diverse groups, Asians and Ashkenazic Jews; a father-mother-child trio set from Ashkenazic Jews; and four microbes commonly used in research.

This suite of genome RMs provides medical and research laboratories worldwide with the tools they need to advance clinical applications of whole genome sequencing, and regulatory bodies with the ability to conduct science-based regulatory oversight of the technology.

Technical Contact: Justin Zook
Email: justin.zook@nist.gov

https://www-s.nist.gov/srmors/view_detail.cfm?srm=8375
https://www-s.nist.gov/srmors/view_detail.cfm?srm=8391
https://www-s.nist.gov/srmors/view_detail.cfm?srm=8392
https://www-s.nist.gov/srmors/view_detail.cfm?srm=8393

NIST RM 8671 NISTmAb, Humanized IgG1κ Monoclonal Antibody

Monoclonal antibodies account for 5 of the 10 top-selling drugs and over $75 billion in annual sales worldwide. Hundreds of monoclonal-antibody-based therapeutics are currently being evaluated for safety and effectiveness in clinical trials to treat grievous illnesses such as cancer and severe autoimmune disorders. Chosen for development in consultation with industry, NISTmAb RM 8671 is an important addition to the toolkits of biological drug manufacturers. The NISTmAb can be used to evaluate the performance of the manifold analytical and biophysical methods that are used to measure critical attributes of monoclonal antibodies. It also provides a representative test molecule for development of novel technology for therapeutic protein characterization.

Analytical and biophysical characterization spanning the entire structure continuum was collected using state-of-the art and emerging technologies to simultaneously establish a historical baseline dataset as well as confirm the NISTmAb's industrial relevance (*1-3*). A resounding interest in a common, open innovation material was reinforced by these studies, and vialing was pursued to enable a longitudinally available, homogeneous, and stable reference material for public release. The NISTmAb RM 8671 has assigned reference values for concentration, charge purity, and size purity as well as informational values on protein particulate content and a comprehensive identity test. This RM may be useful for a variety of purposes including system suitability tests, establishing method or instrument performance and variability, comparing changing analytical test methods, and assisting in method qualification.

1. Schiel, J. E.; Davis, D. L.; Borisov, O. B., *State-of-the-Art and Emerging Technologies for Therapeutic Monoclonal Antibody Characterization Volume 1. Monoclonal Antibody Therapeutics: Structure, Function, and Regulatory Space*. American Chemical Society: 2014; Vol. 1176, p 165.

2. Schiel, J. E.; Davis, D. L.; Borisov, O. B., *State-of-the-Art and Emerging Technologies for Therapeutic Monoclonal Antibody Characterization Volume 3. Defining the Next Generation of Analytical and Biophysical Techniques*. American Chemical Society: 2015; Vol. 1202, p 455.

3. Schiel, J. E.; Davis, D. L.; Borisov, O. B., *State-of-the-Art and Emerging Technologies for Therapeutic Monoclonal Antibody Characterization Volume 2. Biopharmaceutical Characterization: The Nistmab Case Study*. American Chemical Society: 2015; Vol. 1201, p 427.

Technical Contact: John Schiel
Email: john.schiel@nist.gov

https://www-s.nist.gov/srmors/view_detail.cfm?srm=8671

NIST Speakers at PITTCON 2017 – March 6-9, 2017, Chicago, IL

Date	NIST Staff	Event Title	Time	Location
Monday March 6	Lee Yu	Assessment of Arsenic Species in Ginger/Chromatography and Sampling (TP0440)	9:10 am – 9:30 am	W177
Monday March 6	Anzor I. Mikaia	Gas Chromatography – Mass Spectrometry for Determination of Environmentally Important Phenols and Their Thio Analogs as Chemical Modification Products	10:00 am - 12:00 pm	Exposition Floor, Aisle 2500-2600
Monday March 6	Walter Wilson	Evaluation of Polycyclic Aromatic Hydrocarbon Standard Reference Material 2260a on Different Stationary Phases for Gas Chromatography, and Investigations of Retention Behavior of Polycyclic Aromatic Hydrocarbons and Polycyclic Aromatic Sulfur Heterocycles in Normal-Phase Liquid Chromatography	10:00 am – 12:00 pm	Exposition Floor Aisle 2500-2600
Monday March 6	Karen Phinney	Strategies for Protein Biomarker Quantification/Advances in Biomolecule Quantitation by Mass Spectrometry	4:10 pm – 4:45 pm	W178B
Tuesday March 7	Edward Sisco	Modifications of DART-MS for Enhanced Detection of Forensic Compounds/ Analysis of Drugs for Forensics Applications	9:30 am – 9:50 am	W175B
Wednesday March 8	Walter Wilson	Determination of Polycyclic Aromatic Compounds and Their Alkyl-Substituted Derivatives in Combustion-Related Standard Reference Materials	8:50 am – 9:10 am	W175A
Wednesday March 8	Thomas Forbes	Real-Time Mass Spectrometry Detection of Remotely Sampled Vapors and Aerosols by Venturi-Assisted Entrainment and Ionization/Analysis of Explosives and Chemical Weapons for Forensics Applications (TP1910)	2:10 pm – 2:30 pm	W476

NIST Speakers at PITTCON 2017 – March 6-9, 2017, Chicago, IL (cont.)

Date	NIST Staff	Event Title	Time	Location
Wednesday March 8	Catherine Rimmer	Analytical Methods and Reference Materials for Dietary Supplements	11:20 am - 11:50 am	W176C
Thursday March 9	Ashley Green	The Path Toward Urine Albumin Standardization/ Recognizing Cutting-Edge Chemistry from the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChe) (TP2180)	9:45 am - 10:20 am	W181B
Thursday March 9	Marlon Walker	Metrology for 'Stuff' – and Its Impact on Innovation, Our Economic Security, and Quality of Life/Recognizing Cutting-Edge Chemistry from the NOBCChe	9:10 am – 9:45 am	W181B
Thursday March 9	Jason Streit	Scaling the Aqueous Two-Phase Separation of Carbon Nanotubes Through Countercurrent Chromatography/Nanotechnology Applications	1:30 pm – 1:50 pm	W476

**NEW Ordering Process for SRMs 2627a, 2737, and 2738 - Nitric Oxide in Nitrogen **

Certification of the special cylinders is performed on a set schedule. The certification is valid for 2 years from the date of measurement. Please note that NIST will certify the units, prepare the documentation, and package the orders for shipment in the two months preceding the ship month. Orders received during that two-month period will be filled the following ship month.

Production schedule is as follows:

Orders placed in July, August, September, and October will ship in January;
Orders placed in November, December, January, and February will ship in May;
Orders placed in March, April, May, and June will ship in September.

Renewal SRMs/RMs

SRM 1473c Low Density Polyethylene Resin
SRM 1474b Polyethylene Resin
SRM 1667b Propane in Air (Nominal Amount-of-Substance Fraction 50 µmol/mol) Lot #83-K-XX
SRM 3143 Rhenium (Re) Standard Solution
SRM 3156 Tellurium (Te) Standard Solution
SRM 3183 Fluoride Anion (F^-) Standard Solution
SRM 3184 Bromide Anion (Br^-) Standard Solution
SRM 3239 Isoflavones Calibration Solutions
SRM 3262 St. John's Wort (*Hypericum perforatum L.*) Aerial Parts
SRM 8642a FDA Saxitoxin Dihydrochloride Solution

Certificate Revisions

This is a list of our most recent certificate revisions. NIST updates certificates for a variety of reasons, such as to extend the expiration date or to include additional information gained from stability testing. Certificates are the official source for values and expiration dates. Users of NIST Standard Reference Materials should ensure that they have the current certificates. You can print or view a copy of the current certificate at our website at http:/www.nist.gov/srm or contact the Office of Reference Materials at **phone** 301-975-2200, **fax** 301-926-4751, or **email** srminfo@nist.gov

SRM 32e Carbon Low Alloy Steel (SAE 3140)
Editorial changes

SRM 173c Titanium Alloy UNS R56400
Editorial changes

SRM 200b Potassium Dihydrogen Phosphate (Fertilizer Standard)
Editorial changes

SRM 361 AISI 4340 Steel (chip form)
Editorial changes

SRM 625 Zinc-Base Die-Casting Alloy A
Editorial changes

SRM 626 Zinc-Base Die-Casting Alloy B
Editorial changes

SRM 627 Zinc-Base Die-Casting Alloy C
Editorial changes

SRM 628 Zinc-Base Die-Casting Alloy D
Editorial changes

SRM 629 Zinc-Base Die-Casting Alloy E
Editorial changes

SRM 630 Zinc-Base Die-Casting Alloy F
Editorial changes

SRM 656 Silicon Nitride Powders (Quantitative Analysis Powder Diffraction Standard)
Editorial changes

Revisions (continued)

SRM 861 Nickel-Base Superalloy PWA 1484
Editorial changes

SRM 915b Calcium Carbonate
Editorial changes

SRM 971 Hormones in Frozen Human Serum
Editorial changes

SRM 1491a Methyl-Substituted Polycyclic Aromatic Hydrocarbons in Toluene
New expiration date: 31 August 2026
Editorial changes

SRM 1507b 11-Nor-Delta-9-Tetrahydrocannabinol-9-Carboxylic Acid in Freeze-Dried Urine
New expiration date: 31 December 2026
Editorial changes

SRM 1549a Whole Milk Powder
Editorial changes

SRM 1598a Inorganic Constituents in Animal Serum
New expiration date: 01 October 2024
Editorial changes

SRM 1649b Urban Dust
Editorial changes

SRM 1680b Carbon Monoxide in Nitrogen (Nominal Amount-of-Substance Fraction 500 µmol/mol) Lot #2-K-XX
New expiration date: 20 September 2021

SRM 1878b Respirable Alpha Quartz (Quantitative X-Ray Powder Diffraction Standard)
Editorial changes

SRM 1881a Portland Cement (Blended with Slag and Fly Ash)
New expiration date: 01 January 2018
Editorial changes

SRM 1889a Portland Cement (Blended with Limestone)
New expiration date: 01 March 2019
Editorial changes

SRM 1980 Positive Electrophoretic Mobility Positive Electrophoretic Mobility (+μ_E) Standard
Editorial changes

SRM 1982 Thermal Spray Powder – Particle Size Distribution Yttria-Stabilized Zirconia (Spheroidal)
Editorial changes

SRM 2613a Carbon Monoxide in Air (Nominal Amount-of-Substance Fraction 20 µmol/mol) Lot #22-XX-E
New expiration date: 02 May 2024
Editorial changes

Revisions (continued)

SRM 2683c Bituminous Coal (Nominal Mass Fraction 2 % Sulfur)
New expiration date: 01 August 2019
Editorial changes

SRM 2692c Bituminous Coal (Nominal Mass Fraction 1 % Sulfur)
Editorial changes

SRM 2693 Bituminous Coal (Nominal Mass Fraction 0.5 % Sulfur)
New expiration date: 31 December 2021
Editorial changes

SRM 2737 Nitric Oxide in Nitrogen (Nominal Amount-of-Substance Fraction 500 nmol/mol) Lot #2737-A-XX
Editorial changes

SRM 2738 Nitric Oxide in Nitrogen (Nominal Amount-of-Substance Fraction 1000 nmol/mol) Lot #2738-A-XX
Editorial changes

SRM 2772 B100 Biodiesel (Soy-Based)
New expiration date: 28 February 2019
Editorial changes

SRM 2773 B100 Biodiesel (Animal-Based)
New expiration date: 28 February 2019
Editorial changes

SRM 2786 Fine Atmospheric Particulate Matter (Mean Particle Diameter < 4 µm)
Editorial changes

SRM 2787 Fine Atmospheric Particulate Matter (Mean Particle Diameter < 10 µm)
Editorial changes

SRM 3155 Tantalum (Ta) Standard Solution
New expiration date: 31 July 2020
Editorial changes

SRM 3181 Sulfate Anion (SO_4^{2-}) Standard Solution
New expiration date: 30 November 2017
Editorial changes

SRM 3182 Chloride Anion (Cl^-) Standard Solution
New expiration date: 30 September 2018
Editorial changes

SRM 3287 Blueberry Fruit
New expiration date: 01 December 2024
Editorial changes

SRM 4354 Freshwater Lake Sediment Environmental Radioactivity Standard
Editorial changes

Revisions (continued)

SRM 3184 Bromide Anion (Br-) Standard Solution
New expiration date: 30 April 2028

RM 8393 Human DNA for Whole-Genome Variant Assessment (Son of Chinese Ancestry)
Editorial changes

NIST 2017 SRM EXHIBIT SCHEDULE

Pittsburgh Conference PITTCON
Booth #4525
March 6-9, 2017
McCormick Place
Chicago IL

American Chemical Society Spring Meeting ACS
Booth #1213-1215
April 2-6, 2017
Mascone Convention Center
San Francisco, CA

Materials Research Society Spring Meeting MRS
Booth #217
April 17-21, 2017
Phoenix Convention Center
Phoenix, AZ

Clinical Lab Expo AACC
Booth #911
July 30 - August 3, 2017
San Diego Convention Center
San Diego, CA

American Chemical Society Fall Meeting ACS
Booth #2111-2113
August 20-24, 2017
Washington DC Convention Center
Washington, DC

131st Annual Meeting & Exposition AOAC
September 24-27, 2017
Marriott Atlanta Marquis
Atlanta, GA

Materials Science & Technology Conference and Exhibit
October 8-12, 2017
David L. Lawrence Convention Center
Pittsburgh, PA

Material Research Society Fall Meeting
November 26 – December 1, 2017
Hynes Convention Center
Boston, MA

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You can order NIST SRMs through our online request system, which is continually updated. This system is efficient, user-friendly, and secure. Our improved search function finds keywords on SRM detail pages as well as words in titles. **PLEASE NOTE:** Purchase orders and credit cards may be used when ordering an SRM online. Also note that we are placing many historical archive certificates online for your convenience.

https://www-s.nist.gov/srmors

Please Register Your SRM Online!

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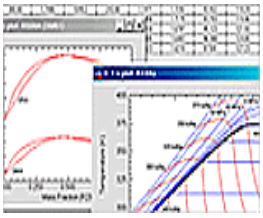
http://www.nist.gov/srm_reg

NIST Measurement Services Websites of Interest

Standard Reference Materials® - http://www.nist.gov/srm

Historical Archived Certificates/Reports of Investigation
https://www-s.nist.gov/srmors/certArchive.cfm



NIST Scientific and Technical Databases - http://www.nist.gov/srd
NIST Data Gateway http://srdata.nist.gov/gateway

Calibrations Services - http://www.nist.gov/calibrations

Standard Reference Instruments
http://www.nist.gov/srm/standard-reference-instruments.cfm