

March 2015

Editor: Regina R. Montgomery

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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.

New and Renewal SRMs/RMs

**NIST SRM 1718 Nitrous Oxide in Air
(Nominal Amount-of-Substance Fraction 1 $\mu\text{mol/mol}$)**

SRM 1718 is a new compressed gas Standard Reference Material. It is certified for a nominal amount-of-substance of 1.0 $\mu\text{mol/mol}$ Nitrous Oxide (N_2O) in Synthetic Air balance. It is used in the determination of nitrous oxide emissions from various sources, and to assist in the monitoring of greenhouse gases in the atmosphere. Nitrous oxide (N_2O) is the third most important anthropogenic greenhouse gas after carbon dioxide (CO_2) and methane (CH_4). This concentration was chosen after input from the Environmental Protection Agency (EPA), the California Air Resources Board (CARB), the Automobile Industry/Government Emissions Research (AIGER) consortium, and domestic Specialty Gas Companies. These stakeholders are interested in measuring N_2O emissions from stationary sources (e.g., smokestacks) and mobile sources (motor vehicles). As monitoring (analysis) of this species grows, the need for EPA Protocol gas standards will increase. Specialty gas companies can use this SRM to produce NIST Traceable Reference Materials (NTRMs) from which they will certify EPA Protocol Mixtures for the end-users. The gas NTRM program was developed 21 years ago to meet the need for large quantities of NIST-traceable gas mixtures.

The synthetic dry air balance gas of this SRM contains ambient levels of oxygen (O_2), argon (Ar), carbon monoxide (CO), and carbon dioxide (CO_2). These are not certified values but are given for informational purposes. This SRM is available in a 6-liter size gas cylinder and contains approximately 0.73 m^3 (25.8 ft^3) of useable mixture. The valve utilized is a CGA-590.



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NIST SRM 2448 Mercury in Brominated Activated Carbon



This SRM is a new NIST matrix material for the measurement of gaseous mercury collected on halogenated activated carbon substrates. The SRM provides NIST traceability and quality assurance for the measurement of mercury in support of environmental emissions regulations such as the EPA Air Toxics Standards for Portland Cement Manufacturing and also the EPA Mercury and Air Toxics Standards (MATS) rule, both of which will go into effect in early 2015. The SRM will also provide quality assurance for mercury assessment and development of flue gas capture technologies at coal-fired electric utilities using activated carbon sorbent injection. Coal-fired power plants are currently the largest single source of anthropogenic mercury emissions in the United States.

Halogen-impregnated substrates based on iodine and bromine significantly improve the capture efficiency of the mercury. SRM 2448 is a brominated activated carbon material that has a certified value for mercury assigned using an isotope dilution inductively coupled plasma mass spectrometry (ID-ICP-MS) primary method. A companion material SRM 2445, which is an iodinated activated carbon, is also under development.

Routine measurements of mercury in activated carbon typically consist of dissolution followed by cold vapor atomic fluorescence spectrometry (CVAFS) or cold vapor atomic absorption spectrometry (CVAAS), or more recently solid-phase combustion methods. These methods can be prone to interferences, especially in the presence of halogens. The availability of SRM 2448 should therefore be very useful as a quality assurance material and will provide critical traceability for environmental compliance monitoring.

Technical Contact: Stephen Long

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NIST RM 8017 Polyvinylpyrrolidone Coated Silver Nanoparticles (Nominal Diameter 75 nm)

The National Institute of Standards and Technology (NIST) has issued a new nanoscale silver (Ag) reference material intended primarily for use as a benchmark and investigative tool for the evaluation of potential environmental, health, and safety risks that may be associated with manufactured nanomaterials during their product lifecycles. A unit of RM 8017 consists of five glass serum vials containing a freeze-dried polyvinylpyrrolidone (PVP)-coated Ag nanoparticle cake. Each vial contains nominally 2 mg of Ag and 20 mg of PVP. The RM must be reconstituted with 2 mL of deionized water before use; the reconstituted Ag concentration is nominally 1 mg/mL and the particle size is nominally 75 nanometers.



Ag nanoparticles are notoriously unstable in ambient environments containing oxygen and moisture, creating a substantial technical challenge for the development of a stable reference material. Combining freeze-drying with storage under inert conditions provides the long-term shelf life necessary to enable interlaboratory comparisons and studies spanning months or years. This is the first such application of freeze-drying or lyophilization to achieve long-term shelf life for a nanoscale reference material. The PVP coating and nominal size were selected to provide congruency with Organization for Economic Cooperation and Development (OECD) test materials utilized in the OECD Manufactured Nanomaterials International Testing Program. RM 8017 is also designed to be a model system for nanoscale Ag commercial additives commonly used to impart antimicrobial properties to consumer products via the slow release of silver ions.

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NIST Speakers at PITTCON 2015 – March 8-12, 2015, New Orleans, LA

Date	NIST Staff	Event Title	Time	Location
Monday March 9	Nicolas M. Contento, Steve Semancik	Temperature-Controlled Electrochemistry Employing Microfabricated Resistive Microheaters (Poster)	1:00 pm – 3:00 pm Slot #23	Expo Floor Hall F Aisles 3900-4500
Monday March 9	Kristin Morton, Steve Semancik	Electrochemical Detection of Glutamate via Biotinylated Enhancement in Gapped Electrodes (Poster)	1:00 pm – 3:00 pm Slot #42	Expo Floor Hall F Aisles 3900-4500
Monday March 9	Anzor Mikaia, Stephen Stein, Huamin Cai, Nino Todua, Kirill Tretyakov	Analytical Derivatives for the NIST/NIH/EPA Mass Spectral Library	4:05 pm Slot #9	Room 270
Monday March 9	Kirill Tretyakov, Anzor Mikaia, Nino Todua, John Koksa	Detection of Hazardous Aromatic Amines and Amides by Mass Spectrometry Methods	4:05 pm Slot #9	Room 269
Tuesday March 10	Lee L Yu, Clay Davis, Rick Paul, Cynthia Ward	A New SRM for Assessment of Arsenic Exposure Through Urine Analysis (Poster)	1:00 pm – 3:00 pm Slot #7	Expo Floor Hall F Aisles 3900-4500
Wednesday March 11	Jorge O. Ona-Ruales, Patty Ranaivo, Yosadara Ruiz-Morales, Lane Sander, Stephen Wise	Identification of Six-Ring Cata-Condensed $C_{26}H_{16}$ Polycyclic Aromatic Hydrocarbons in Coal Tar by Liquid Chromatography with Ultraviolet-Visible Spectroscopy, Gas Chromatography with Mass Spectrometry, and Theoretical Analysis	10:45 am Slot #8	Room 270
Wednesday March 11	Iain Campuzano, Stanislav Rubakhin, Bagal Dhanashri, Carlos Larriba, Paul Schnie	Ion Mobility and Native Mass Spectrometry Measurements of the Humanized IgGk NIST Monoclonal Antibody Standard	2:10 pm Slot #3	Room 267
Wednesday March 11	Nino Todua, Charles Wilkins, Anzor Mikaia, Kirill Tretyakov	Mass Spectrometry of Amino Acid Derivatives	2:30 pm Slot #4	Room 277
Wednesday March 11	Mike Kelley, Lyn Gameson, Joe Hodges	Gas Panel Discussion	2:00 pm – 5:00 pm	Room 344
Thursday March 12	Catherine Rimmer, Karen Phinney, Melissa Phillips, Benjamin Place, Lane Sander, Stephen Wise	Liquid Chromatography Research at the National Institute of Standards and Technology (NIST) (Symposia)	2:10 pm Slot #3	Room 238

ORDER NIST SRMs ONLINE

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!

Registering will ensure that you will be notified of any technical updates or developments.

http://www.nist.gov/srm_reg

Renewal SRMs/RMs

NIST SRM 640e Line Position and Line Shape Standard for Powder Diffraction (Silicon Powder)
NIST SRM 660c Line Position and Line Shape Standard for Powder Diffraction (Lanthanum Hexaboride Powder)

SRMs 640e Line Position and Line Shape Standard for Powder Diffraction (Silicon Powder) and 660c Line Position and Line Shape Standard for Powder Diffraction (Lanthanum Hexaboride Powder) are the renewals for SRMs 640d and 660b, silicon and lanthanum hexaboride powders respectively, certified for calibration and characterization of powder diffraction equipment. The laboratory X-ray powder diffractometer offers several virtues that have rendered it a principal characterization device for materials science providing critical data for a broad range of technical disciplines. The technique is applicable to any material possessing order on the scale of X-ray wavelengths. This would include any crystalline materials such as ceramics, polymers, metals, cements and pharmaceuticals, as well as many materials that are not necessarily crystalline but do possess some degree of short-range order. Both SRMs are certified with respect to lattice parameter and can be used for calibration of powder diffraction line position. However, it is necessary in certain applications to characterize the diffraction line shape that is intrinsic to the instrument as well. In order to accomplish this, the standard must be prepared with minimal crystallographic defects and the crystallites must be within a specific size range. Both of these SRMs were prepared with these criteria in mind; however, SRM 660c is considered to be superior to SRM 640e for this application. SRMs 640e and 660c were prepared and certified with a procedure that was identical to that used for 640d and 660b; any measurement issue that was addressed successfully with earlier SRMs can be addressed using these renewals.

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Renewal SRMs/RMs (continued)



SRM 1641e Mercury in Water

SRM 1641e is a renewal material for SRM 1641d Mercury in Water, which is widely used for the calibration of mercury measurement instrumentation and as a quality assurance material. Mercury is a highly toxic element that has accumulated in ecosystems for decades and therefore accurate measurements of mercury are extremely important for assessment of environmental impact and risk. SRM 1641e is intended to underpin these measurement efforts, serving as a primary traceability and calibration tool. The renewal material

has been re-designed, and differs from the previous issue in that the mercury mass fraction has been lowered from approximately 1.56 mg/kg to 0.10 mg/kg to reflect the improvement in detection capabilities and dynamic working ranges of modern mercury measurement instrumentation. The preservative matrix has also been changed from a gold complex to a mineral acid mixture of hydrochloric and nitric acids. These changes were made in response to customer feedback and matrix interference issues associated with the gold preservative. Determinations of mercury were made using a primary method based on isotope-dilution cold-vapor inductively coupled plasma – mass spectrometry.

Technical Contact: Stephen Long

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NIST SRM 1647f Priority Pollutant Polycyclic Aromatic Hydrocarbons in Acetonitrile



Polycyclic aromatic hydrocarbons (PAHs) are widespread environmental contaminants resulting from emissions from a variety of sources including: industrial combustion and discharge of fossil fuels, residential heating (both fossil fuels and wood burning), and motor vehicle exhaust. Because of their mutagenic and carcinogenic properties, PAHs have been measured in a variety of environmental matrices including air, water, soil (sediment), and tissue samples. PAHs are usually present in environmental samples as extremely complex mixtures; these mixtures contain many isomeric structures and alkylated isomers which vary greatly

in relative concentrations of the individual components and in carcinogenic and/or mutagenic properties.

In 1979, the U.S. Environmental Protection Agency (EPA) identified 16 PAHs as priority pollutants, and shortly thereafter, EPA Method 610 Polynuclear Aromatic Hydrocarbons was introduced detailing their analysis. To support EPA Method 610, NIST developed its first calibration solution SRM for organic contaminants in 1981, SRM 1647 Priority Pollutant PAHs in Acetonitrile, which contains the 16 EPA PAHs in acetonitrile and is intended primarily for use in calibrating liquid chromatographic methods. Since its introduction, SRM 1647 has been reissued six times, with the most recent release of SRM 1647f in fall 2014.

A unit of SRM 1647f consists of five 2-mL ampoules, each containing approximately 1.3 mL of an acetonitrile solution of the selected PAHs. Levels of the 16 priority pollutant PAHs in SRM 1647f are modeled closely after prior releases of the SRM; however, 95 % confidence intervals (i.e., expanded uncertainties) for certified mass fractions have been improved significantly and range from 1.1 % to 2.7 %. (For comparison, 95 % confidence intervals for certified mass fractions ranged from 2.0 % to 5.8 % for the previously issued SRM 1647e).

Technical Contact: Lane Sander

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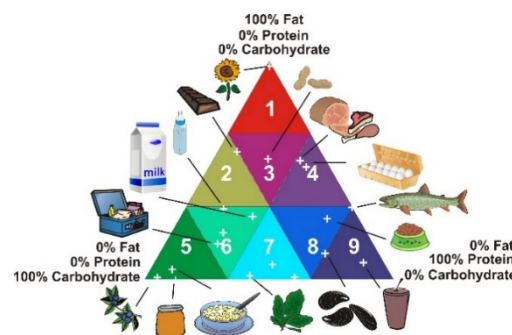
Renewal SRMs/RMs (continued)

NIST SRM 1845a Whole Egg Powder



Standard Reference Material 1845a Whole Egg Powder is the latest food-matrix material available from NIST. SRM 1845a is one of several SRMs currently available to support the requirements of the Nutrition Labeling and Education Act of 1990. The renewal SRM will replace SRM 1845 Cholesterol in Whole Egg Powder and RM 8415 Whole Egg Powder, both of which are no longer available. SRM 1845a is a whole egg powder prepared from USDA-inspected eggs by a commercial manufacturer. A unit of SRM 1845a consists of five heat-sealed aluminized pouches, each containing approximately 10 g of material.

This SRM is intended for use in method development and validation as well as for quality assurance and for use in assigning values to in-house control materials. It is important for laboratories in the food and nutrition industries to analyze a material for quality assurance that is compositionally similar to that of the test samples being analyzed. The AOAC food triangle (shown on the right), in which foods are positioned based on their fat, protein, and carbohydrate content, can be used to help select an appropriate quality control material. SRM 1845a is located in sector 4 of this triangle and is currently the only powdered material in this sector. The SRM will provide a unique matrix for laboratories interested in analysis of unfortified materials of similar composition. Certified values are assigned for cholesterol and thirteen fatty acids, twelve elements, and six vitamins. Reference values are assigned for nine elements including iodine, seven vitamins, choline and carnitine, proximates, calories, twelve fatty acids, and eighteen amino acids.



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NIST SRM 2972a 25-Hydroxyvitamin D Calibration Solutions

SRM 2972a 25-Hydroxyvitamin D Solutions replaces SRM 2972 25-Hydroxyvitamin D₂ and D₃ Calibration Solutions. The new SRM 2972a contains the same two 25-hydroxyvitamin D₂ and D₃ solutions that were in SRM 2972; however, the certified values have been revised based on new measured values. To provide additional value to customers, SRM 2972a incorporates two new solutions, one containing a higher concentration of the predominant human vitamin D metabolite, 25-hydroxyvitamin D₃, and the other containing the 3-epi-25-hydroxyvitamin D₃ metabolite. As with the former SRM 2972, SRM 2972a is intended for calibration of assays that are used to determine vitamin D metabolites, particularly those used for clinical diagnostics. A unit of SRM 2972a consists of five ampoules of each of the four individual solutions, with each ampoule containing approximately 1.2 mL of solution.

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Renewal SRMs/RMs (continued)

NIST SRM 1885b Portland Cement

Standard Reference Material 1885b Portland Cement is a Type I-II cement intended for validation of elemental analysis test methods for manufactured portland cement products. It went on sale in December 2014 and is supplied in a unit of five vials with each vial containing approximately 5 g of powder. The cement meets ASTM International C150 / C150M - 12 Standard Specification for Portland Cement and was manufactured using a typical process. It is notable that the SRM 1885b composition differs somewhat from its predecessor SRM 1885a, which was a high alkali cement from a source in Fiji. After an extended search, NIST was unable to locate a supply of high alkali cement for SRM 1885b. The consequence is that the ranges for mass fractions of Na and K in the NIST SRM cements now have lower maximums than when SRM 1885a was available.

The effort to replace the SRM 1880a series continues with SRM 1889b Portland Cement Blended with Limestone, which is currently in development. SRM 1886b White Portland Cement is in development and will replace SRM 1886a when the supply of it is depleted. Also in process are SRM 1881b Portland Cement Blended with Fly Ash, and SRM 635a Portland Cement Blended with Slag. SRM 1881b candidate material contains a mass fraction of 30 % coal fly ash. SRM 635a candidate material contains a mass fraction of 40 % slag. Together, these two new SRM compositions will take the place of SRM 1881a, which contains a mass fraction of 5 % of a 50/50 mix of fly ash and slag.

NIST will continue to support manufacturing of hydraulic cement products. Recommendations for compositions are welcome. Please be prepared to provide detailed information about demand for the cement and why such a composition is important in the context of qualification for ASTM C114-13 Standard Test Methods for Chemical Analysis of Hydraulic Cement.

Technical Contact: John Sieber
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SRM 1665b	Propane in Air (Nominal Amount-of-Substance Fraction 3 $\mu\text{mol/mol}$) Lot # 85-J-XX
SRM 1946	Lake Superior Fish Tissue
SRM 2031b	Metal-on-Fused-Silica Neutral Density Filters (250nm-635nm)
SRM 2637a	Carbon Monoxide in Nitrogen (Nominal Amount-of-Substance Fraction 2500 $\mu\text{mol/mol}$) Lot # 56-G-XX
SRM 2751	Methane in Air (Nominal Amount-of-Substance Fraction 100 $\mu\text{mol/mol}$) Lot # 212-D-XX
SRM 3119a	Gallium (Ga) Standard Solution Lot # 140124
SRM 3126a	Iron (Fe) Standard Solution Lot # 140812
SRM 3237	Soy Protein Concentrate

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. 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.

NIST SRM 909c Frozen Human Serum



The NIST Chemical Sciences Division has recently updated SRM 909c Frozen Human Serum to include certified values for selected electrolytes. This SRM was originally issued in December 2010 with certified values for cholesterol, creatinine, glucose, total glycerides, urea, uric acid, and selenium. This material was also assigned reference values for total protein and sodium. To meet the current demand for a serum material with assigned electrolyte values, certified values for calcium, chloride, magnesium, and potassium were recently added. Also, the sodium value was updated from a reference value to a certified value. SRM 909c Frozen Human Serum is a single human serum pool with no spiking of clinical analytes. The availability of this SRM allows laboratories to evaluate the accuracy of their measurement methods as well as provide quality assurance when assigning values to in-house control materials for the specified constituents.

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SRM 360b Zirconium (Sn-Fe-Cr) Alloy

Editorial changes

SRM 1544 Fatty Acids and Cholesterol in a Frozen Diet Composite

New expiration date: 30 April 2020

Editorial changes

SRM 1549a Whole Milk Powder

Editorial changes

SRM 1632d Trace Elements in Coal (Bituminous)

New expiration date: 01 January 2020

SRM 1762a Low Alloy Steel

Editorial changes

SRM 1849a Infant/Adult Nutritional Formula

Editorial changes

SRM 1941b Organics in Marine Sediment

Editorial changes

SRM 1957 Organic Contaminants in Non-Fortified Human Serum

New expiration date: 31 August 2025

Editorial changes

Revisions (continued)

SRM 1958 Organic Contaminants in Fortified Human Serum

New expiration date: 31 August 2025

Editorial changes

SRM 2492 Bingham Paste Mixture for Rheological Measurements

Editorial changes

SRM 2553 Optical Fiber Coating Diameter (Nominal Refractive Index 1.504)

Editorial changes

SRM 2554 Optical Fiber Coating Diameter (Nominal Refractive Index 1.515)

Editorial changes

SRM 2585 Organic Contaminants in House Dust

New expiration date: 01 June 2025

SRM 2640a Carbon Monoxide in Nitrogen (Nominal Amount-of-Substance Fraction 2 % mol/mol)**Lot # 53-C-XX**

New expiration date: 30 July 2022

Editorial changes

SRM 2644a Propane in Nitrogen (Nominal Amount-of-Substance Fraction 250 μ mol/mol)**Lot # 101-C-XX**

New expiration date: 07 July 2022

Editorial changes

SRM 2730 Hydrogen Sulfide in Nitrogen (Nominal Amount-of-Substance Fraction 5 μ mol/mol)**Lot # 65-D-XX**

New expiration date: 24 February 2018

Editorial changes

SRM 3112a Chromium (Cr) Standard Solution Lot # 030730

New expiration date: 01 July 2018

Editorial changes

SRM 3234 Soy Flour

Editorial changes

SRM 3275 Omega-3 and Omega-6 Fatty Acids in Fish Oil

New expiration date: 31 March 2019

Editorial changes

NIST SRM 2015 Exhibit Schedule

Pittsburgh Conference*March 8-12, 2015*

Booth #1910-1913

Morial Convention Center

New Orleans, LA

American Chemical Society Spring Meeting*March 22-26, 2015*

Booth #325

Denver Convention Center

Denver, CO

Materials Research Society Spring Meeting*April 6-10, 2015*

Booth #610

Moscone Convention Center

San Francisco, CA

The American Society of Crime Laboratories Directors*April 26-30, 2015*

Booth #420

Marriott Wardman Park

Washington, DC

IFT – Food Expo*July 12-14, 2015*

Booth #2180

McCormick Place South

Chicago, IL

AACC Clinical Lab Expo*July 26-30, 2015*

Booth #4227

Atlanta Convention Center

Atlanta, GA

American Chemical Society Fall Meeting*August 16-20, 2015*

Booth #543

Boston Convention Center

Boston, MA

AOAC INTERNATIONAL*September 27-30, 2015*

Booth #512

Westin Bonaventure Hotel

Los Angeles, CA

MS&T 15 Materials Science & Technology Conference and Exhibition*October 4-8, 2015*

Booth #537-636

Greater Columbus Convention Center

Columbus, OH

BERM 2015*October 11-15, 2015*

Gaylord National Convention Center

National Harbor, MD

Material Research Society Fall Meeting*November 29 – December 4, 2015*

Hynes Convention Center

Boston, MA

NIST Measurement Services Websites of Interest

Standard Reference Materials



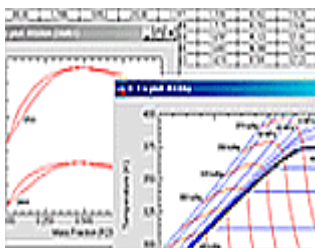
Standard Reference Materials

<http://www.nist.gov/srm>

Historical Archived Certificates/Reports of Investigation

<https://www-s.nist.gov/srmors/certArchive.cfm>

Standard Reference Data



NIST Scientific and Technical Databases

<http://www.nist.gov/srd>

NIST Data Gateway

<http://srdata.nist.gov/gateway>

Calibrations



Calibrations Services

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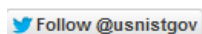
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