New and Renewal SRMs/RMs

NIST SRM 1718 Nitrous Oxide in Air (Nominal Amount-of-Substance Fraction 1 µmol/mol)

SRM 1718 is a new compressed gas Standard Reference Material. It is certified for a nominal amount-of-substance of 1.0 µmol/mol Nitrous Oxide (N₂O) 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 (N₂O) is the third most important anthropogenic greenhouse gas after carbon dioxide (CO₂) and methane (CH₄). 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 N₂O 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 (O₂), argon (Ar), carbon monoxide (CO), and carbon dioxide (CO₂). 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 m³ (25.8 ft³) of useable mixture. The valve utilized is a CGA-590.

Technical Contact: Michael Kelley
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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.

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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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301-975-2200 phone 301-948-3730 fax http://www.nist.gov/srm srminfo@nist.gov
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<th>NIST Staff</th>
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<td>Monday March 9</td>
<td>Nicolas M. Contento, Steve Semancik</td>
<td>Temperature-Controlled Electrochemistry Employing Microfabricated Resistive Microheaters (Poster)</td>
<td>1:00 pm – 3:00 pm Slot #23</td>
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<td>Analytical Derivatives for the NIST/NIH/EPA Mass Spectral Library</td>
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<td>Identification of Six-Ring Cata-Condensed C26H16 Polycyclic Aromatic Hydrocarbons in Coal Tar by Liquid Chromatography with Ultraviolet-Visible Spectroscopy, Gas Chromatography with Mass Spectrometry, and Theoretical Analysis</td>
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<td>Iain Campuzano, Stanislav Rubakhin, Bagal Dhanashri, Carlos Larriba, Paul Schnie</td>
<td>Ion Mobility and Native Mass Spectrometry Measurements of the Humanized IgGk NIST Monoclonal Antibody Standard</td>
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<td>Nino Todua, Charles Wilkins, Anzor Mikaia, Kirill Tretyakov</td>
<td>Mass Spectrometry of Amino Acid Derivatives</td>
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<td>Wednesday March 11</td>
<td>Mike Kelley, Lyn Gameson, Joe Hodges</td>
<td>Gas Panel Discussion</td>
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<td>Thursday March 12</td>
<td>Catherine Rimmer, Karen Phinney, Melissa Phillips, Benjamin Place, Lane Sander, Stephen Wise</td>
<td>Liquid Chromatography Research at the National Institute of Standards and Technology (NIST) (Symposia)</td>
<td>2:10 pm Slot #3</td>
<td>Room 238</td>
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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. 

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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.

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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 1647c).

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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.

Technical Contact: Mary Bedner
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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 μmol/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 μmol/mol) Lot # 56-G-XX
SRM 2751 Methane in Air (Nominal Amount-of-Substance Fraction 100 μmol/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.

Technical Contact: Johanna Camara
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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 µmol/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 µmol/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
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
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