Date of Issue:
17 December 2013

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 8011
SRM Name: Gold Nanoparticles Nominal 10 nm Diameter
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

RM 8011 consists of nominally 5 mL of citrate stabilized gold nanoparticles in an aqueous suspension, supplied in hermetically sealed pre scored glass ampoules sterilized by gamma irradiation. A unit of RM 8011 consists of two 5 mL ampoules. This Reference Material (RM) is intended primarily to evaluate and qualify methodology and/or instrument performance related to the physical/dimensional characterization of nanoscale particles used in pre-clinical biomedical research. The RM may also be useful in the development and evaluation of in vitro assays designed to assess the biological response (e.g., cytotoxity, hemolysis) of nanomaterials, and for use in interlaboratory test comparisons.

Company Information

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2. HAZARDS IDENTIFICATION

Note: The concentration of gold nanoparticles in this suspension is below the reportable limit for SDS information as required by OSHA 29 CFR 1910.1200 (see Report of Investigation for concentration value). This material should be handled as recommended by the National Institute for Occupational Safety and Health (NIOSH). According to NIOSH, occupational health risks associated with manufacturing and using nanomaterials are not fully understood. Minimal information is currently available on dominant exposure routes, potential exposure levels, and material toxicity of nanomaterials.

Classification

Physical Hazard: Not classified.
Health Hazard: Not classified.

Label Elements

Symbol:
No Symbol

Signal Word:
No Signal Word

Hazard Statement(s): Not applicable.

Precautionary Statement(s): Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Gold nanoparticles aqueous suspension

Other Designations:
Gold nanoparticles, colloidal gold

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Report of Investigation.

Non-Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Gold	7440-57-5	231-165-9	<0.01
Tri-Sodium Citrate	6858-44-2	614-623-6	<0.01
Water	7732-18-5	231-791-2	>99

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. Get medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: If a large amount is swallowed, get medical attention.

Most Important Symptoms/Effects, Acute and Delayed: No information on significant adverse effects.

Indication of any immediate medical attention and special treatment needed, if necessary: If adverse effects are present, seek immediate medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard.

Extinguishing Media:
Suitable: Use extinguishing media appropriate to the surrounding fire.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Thermal decomposition will form oxides of nitrogen.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 0 Fire = 0 Reactivity = 0

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Do not touch spilled material. Notify safety personnel of spills. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. .

7. Handling and Storage

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

Storage: Store at room temperature in its original ampoule and package, and protected from intense direct light or ultraviolet radiation. Do not freeze.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: No occupational limits established

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

NOTE: The physical and chemical data provided are for the pure components. No physical or chemical data are available for this solution.

Descriptive Properties:	**Water (>95 % of this SRM)**	**SRM 8011**
Appearance (physical state, color, etc.):	Clear liquid	Red-pink solution
Molecular Formula:	H_2O	Not applicable
Molar Mass (g/mol):	18.02	Not applicable
Odor:	Odorless	Not available
Odor threshold:	Not available	Not available
pH:	7	7.19
Evaporation rate:	Not available	Not available
Melting point/freezing point (ºC):	0 (32 ºF)	Not available
Relative Density (g/L):	1	Not available
Vapor Pressure (mmHg):	17.5 (20 ºC)	Not available
Vapor Density (air = 1):	Not available	Not available
Viscosity (cP):	Not available	Not available
Solubility(ies):	Alcohol	Water
Partition coefficient (n-octanol/water):	Not available	Not available
Particle Size (if relevant)	Not applicable	10 nm
Thermal Stability Properties:		
Autoignition Temperature (ºC):	Not applicable	Not applicable
Thermal Decomposition (ºC):	Not applicable	Not applicable
Initial boiling point and boiling range (ºC):	100 (212 ºF)	Not applicable
Explosive Limits, LEL (Volume %):	Not applicable	Not applicable
Explosive Limits, UEL (Volume %):	Not applicable	Not applicable
Flash Point (ºC)	Not applicable	Not applicable
Flammability (solid, gas):	Not applicable	Not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: None reported.

Incompatible Materials: No data available.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: No data available.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: _____ Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: No data available.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: No information on significant adverse effects.

Skin Contact: May be harmful by skin absorption.

Eye Contact: May cause irritation.

Ingestion: May be harmful by ingestion in large amounts.

Numerical Measures of Toxicity:

Acute Toxicity: No data available.

Skin Corrosion/Irritation: No data available.

Serious Eye damage/ Eye irritation: No data available

Respiratory Sensitization: No data available.

Skin Sensitization: No data available.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen _____ Yes X No

Components are not listed in NTP, IARC or OSHA as a carcinogen.

Reproductive Toxicity: No data available.

Specific Target Organ Toxicity, Single Exposure: No data available.

Specific Target Organ Toxicity, Repeated Exposure: No data available.

Aspiration Hazard: No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: No data available

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: This material is not regulated by DOT or IATA.

.15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not applicable to the identified NIST RM.

SARA Title III Section 302 (40 CFR 355.30): Not applicable to the identified NIST RM.

SARA Title III Section 304 (40 CFR 355.40): Not applicable to the identified NIST RM.

SARA Title III Section 313 (40 CFR 372.65): Not applicable to the identified NIST RM.

OSHA Process Safety (29 CFR 1910.119): Not applicable to the identified NIST RM.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No.
CHRONIC HEALTH:	No.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:
California Proposition 65: Not listed.

U.S. TSCA Inventory: Gold listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations:
WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 17 December 2013

Sources:

ChemAdvisor, Inc., MSDS *Water*, 13 March 2013.

ChemAdvisor, Inc., MSDS *Tri-Sodium Citrate*, 23 June 2009.

ChemAdvisor, Inc., MSDS *Gold*, 13 March 2013.

Ted Pella, Inc., MSDS Colloidal Gold, 12 April 2012.

NIOSH Publications, *Approaches to Safe Nanotechnology: Managing the Health and Safety Concerns Associated with Engineered Nanomaterials*; available at http://www.cdc.gov/niosh/docs/2009-125/ (accessed Dec 2013).

NIOSH Publications, *General Safe Practices for Working with Engineered Nanomaterials in Research Laboratories*; available at http://www.cdc.gov/niosh/docs/2012-147/ (accessed Dec 2013).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50%	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System
n.o.s.	Not Otherwise Specified		

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The assigned values for this material are given in the NIST Report of Investigation.

Users of this RM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at http://www.nist.gov/srm.