Date of Issue:
10 October 2017

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 1879b
SRM Name: Respirable Cristobalite (Quantitative X-Ray Powder Diffraction Standard)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended for use in preparation of calibration standards for quantitative analyses of cristobalite by X-ray powder diffraction in accordance to National Institute for Occupational Safety and Health (NIOSH) Analytical Method 7500 (or equivalent). A unit of SRM 1879b consists of approximately 5 g of powder bottled in an argon atmosphere.

Company Information

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2. Hazards Identification

Note: This particulate material consists of respirable cristobalite. The health and physical hazard information provided in this SDS contains the effects associated with the inhalation of cristobalite particulates.

Classification

Physical Hazard:	Not classified.	
Health Hazard:	Carcinogen	Category 1
	STOT, Repeated Exposure	Category 1

Label Elements

Symbol



Signal Word

DANGER

Hazard Statement(s):

H350	May cause lung cancer.
H372	Causes damage to lungs through prolonged or repeated inhalation.

Precautionary Statement(s):

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves, protective clothing, and eye protection.
P308 + P313	If exposed or concerned: Get medical attention.
P405	Store locked up.
P501	Dispose of contents and container in accordance with local regulations.

Hazards Not Otherwise Classified: Not applicable.

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

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Cristobalite (respirable)

Other Designations: Alpha-cristobalite; cristoballite; alpha-crystobalite; crystoballite; metacristobalite; silica; crystalline-cristobalite; silicic anhydride; SiO_2

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

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Cristobalite	14464-46-1	238-455-4	88.2

4. FIRST AID MEASURES

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes. Thoroughly clean and dry contaminated clothing before reuse.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If adverse effects occur after ingestion, seek medical treatment.

Most Important Symptoms/Effects, Acute and Delayed: May cause irritation, lung damage, silicosis, and cancer.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Use extinguishing agents appropriate for surrounding fire.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: None listed.

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 = 1 Fire = 0 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

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

Storage: Store and handling in accordance with all current regulations and standards. Keep separated from incompatible substances (See Section 10, "Stability and Reactivity").

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

ACGIH (TLV):	0.025 mg/m^3 (TWA) [respirable fraction]
OSHA (PEL):	(1/2)(30)/(%SiO2 + 2) mg/m^3 (TWA) [total dust] (1/2)(250)/(%SiO2 + 5) mppcf (TWA) [respirable fraction] (1/2)(10)/(%SiO2 + 2) mg/m^3 (TWA) [respirable fraction]
NIOSH (REL):	0.05 mg/m^3 (TWA) [respirable dust] 50 mg/m^3 (IDLH) [respirable dust]

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 with a face shield. An eyewash 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

Descriptive Properties	**Cristobalite**
Appearance (physical state, color, etc.)	white, amorphous powder
Molecular Formula	SiO_2
Molar Mass (g/mol)	60.09
Odor	Odorless
Odor threshold	not available
pH	not applicable
Evaporation rate	not applicable
Melting point/freezing point (ºC)	1710 (3110 ºF)
Relative Density as specific gravity (water = 1)	2.32
Vapor Pressure (mmHg)	10 at 1732 ºC
Vapor Density (air = 1)	not applicable
Viscosity (cP)	not applicable
Solubility(ies)	insoluble in water and organic solvents; soluble in hydrofluoric acid and molten alkali
Partition coefficient (n-octanol/water)	not available
Particle Size (if relevant)	≈3.5 µm
Thermal Stability Properties	
Autoignition Temperature	not applicable
Thermal Decomposition	not available
Initial boiling point and boiling range (ºC)	2230 (4046 ºF)
Explosive Limits, LEL (Volume %)	not applicable
Explosive Limits, UEL (Volume %)	not applicable
Flash Point	not applicable
Flammability (solid, gas)	not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid generating dust.

Incompatible Materials: Oxidizing materials, acids, bases, combustible materials.

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

Hazardous Decomposition: Thermal decomposition will produce miscellaneous decomposition products.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation _____ Skin _____ Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: May cause irritation, lung damage, silicosis, and cancer.

Potential Health Effects (Acute, Chronic and Delayed)

Inhalation: Inhalation of nuisance dust has little adverse effect on the lungs. Acute exposure to fine particles containing respirable crystalline silica may result irritation; chronic exposure may result in irritation, chest pain, weight loss, difficulty breathing, digestive disorders, bluish skin color, lung damage, cancer, and death.

Skin Contact: May cause irritation due to mechanical abrasion.

Eye Contact: May cause irritation due to mechanical abrasion.

Ingestion: No data available.

Numerical Measures of Toxicity

Acute Toxicity: Not classified; no data available.

Skin Corrosion/Irritation: Not classified; no data available.

Serious Eye damage/ Eye irritation: Not classified; no data available.

Respiratory Sensitization: Not classified; no data available.

Skin Sensitization: Not classified; no data available.

Germ Cell Mutagenicity: Not classified; no data available.

Carcinogenicity: Category 1

Listed as a Carcinogen/Potential Carcinogen X Yes _____ No

Silica, crystalline (as respirable dust) is listed by IARC and NTP as a human carcinogen. Silica, crystalline is not listed by OSHA as a designated carcinogen.

Rat Intrapleural TD: 100 mg/kg; Rat Intrapleural TDLo: 90 mg/kg

Reproductive Toxicity: Not classified.

STOT, Single Exposure: Not classified; no data available.

STOT, Repeated Exposure: Category 1; Cumulative exposure may result in reduced lung capacity and silicosis.

Aspiration Hazard: Not classified.

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: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

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

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

State Regulations:

California Proposition 65: WARNING! This product contains a chemical (crystalline silica of respirable size) known to the state of California to cause cancer.

U.S. TSCA Inventory: Cristobalite is listed.

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

Canadian Regulations:

WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 10 October 2017

Sources: ChemAdvisor, Inc., SDS *Cristobalite*, 09 December 2015.

IARC, *Silica Dust, Crystalline, In the form of Quartz or Cristobalite*, Vol.100C (2012); available at http://monographs.iarc.fr/ENG/Monographs/vol100C/mono100C-14.pdf (accessed Oct 2017).

NTP; *Silica, Crystalline (Respirable Size)*, Report on Carcinogens, Twelfth Edition (2011); available at http://ntp.niehs.nih.gov/ntp/roc/content/profiles/silica.pdf (accessed Oct 2017).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NIST	National Institute of Standards and Technology
ALI	Annual Limit on Intake	NRC	Nuclear Regulatory Commission
CAS	Chemical Abstracts Service	NTP	National Toxicology Program
CEN	European Committee for Standardization	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
CPSU	Coal Mine Dust Personal Sample Unit	REL	Recommended Exposure Limit
DOT	Department of Transportation	RM	Reference Material
EC50	Effective Concentration, 50 %	RQ	Reportable Quantity
EINECS	European Inventory of Existing Commercial Chemical Substances	RTECS	Registry of Toxic Effects of Chemical Substances
EPCRA	Emergency Planning and Community Right-to-Know Act	SARA	Superfund Amendments and Reauthorization Act
IARC	International Agency for Research on Cancer	SCBA	Self-Contained Breathing Apparatus
IATA	International Air Transport Association	SRM	Standard Reference Material
IDLH	Immediately Dangerous to Life and Health	STEL	Short Term Exposure Limit
ISO	International Organization for Standardization	STOT	Specific Target Organ Toxicity
LC50	Lethal Concentration, 50 %	TDLo	Toxic Dose Low
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
MSHA	Mine Safety and Health Administration	UEL	Upper Explosive Limit
NIOSH	National Institute for Occupational Safety and Health	WHMIS	Workplace Hazardous Materials Information System

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 certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM 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.