

Safety Data Sheet



1. Identification of the Substance/Mixture and the Supplier

Supplier : National Institute of Advanced Industrial Science and Technology (AIST)
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Identity of : Certified reference material NMIJ CRM 5207-a
 Substance/Mixture : Tungsten Dot-array
 Recommended Use of : This CRM is intended for use in the magnification calibration of
 the Chemical and instruments, and examination of instrument conditions through image
 Restriction on Use sharpness measurement in scanning electron microscopy (SEM). Do not
 use this reference material for other purposes than testing/research.
 This CRM is a reference material (specified in the Japanese Industrial
 Standard (JIS) Q 0030).

2. Hazards Identification

GHS classification: - : Classification not possible
 GHS label element : -
 Signal word : -
 Hazard and toxicity : -
 Other hazard and : Tungsten powder generated by processing or the like is irritating to eyes.
 toxicity : The silicon powder generated by processing or the like is a flammable
 metal powder.
 Precautionary : [Preventive measures]
 statement : Use proper protective equipment when handling.
 When processing, use eye protection equipment.
 In case of powder, it is flammable and promptly removes near ignition
 sources.
 Prepare fire extinguishing equipment in preparation for ignition.
 [Response]
 If swallowed: Drink a large amount of water to induce vomiting. If feel
 unwell, get medical assistance.
 If in eyes : Rinse cautiously with clean water for several minutes.
 Remove contact lenses, if present and easy to do. Continue
 rinsing. If eye irritation persists: Get medical
 advice/attention.
 [Storage]
 Store in a clean, cool and dark place.

[Disposal]

Dispose of this reference material in accordance with applicable legislation and local government ordinance.

Entrust disposal of this reference material to a professional waste disposal company licensed by prefectural governor.

Hazardous and toxic properties not specified in the above are not subject to the classification or not classifiable.

3. Composition/Information on Ingredients

Substance or mixture	:	Mixture
Chemical name	:	NMIJ CRM 5207-a Tungsten Dot-array
Ingredient 1		
Chemical name	:	Silicon
Synonym	:	-
Chemical formula	:	Si
Molecular weight	:	28.1
CAS number	:	7440-21-3
Content	:	99.9 % or more
Reference Number in Gazetted List in Japan	:	—
Ingredient 2		
Chemical name	:	Tungsten
Synonym	:	Wolfram
Chemical formula	:	W
Molecular weight	:	183.84
CAS number	:	7440-33-7
Content	:	0.02 % or less
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. :—
	:	Industrial Safety and Health Act : —
Hazardous Component	:	Silicon

4. First-aid Measures

If inhaled	:	Low risks in normal handling
If on skin	:	Rinse thoroughly with clean water. If inflammation occurs: Get medical advice/attention.
If in eyes	:	No risks in normal handling If ruptured and scattered fractions or dust caught in eyes: Rinse thoroughly with clean water. Get medical advice/attention as necessary.
If swallowed	:	Have victim drink plenty of water to induce vomiting. Call a doctor/physician.
Most Critical Characteristic and Symptom of Expected Acute and Delayed Symptom	:	If dust contacts with eyes or mucus membrane: Irritation occurs.
Measures to be taken to protect the person applying	:	Wear personal protective equipment.

5. Fire-fighting Measures

- Extinguishing Media : This reference material is nonflammable.
Use extinguishing media appropriate for surrounding fire
If in a form of powder: Use dry chemical extinguishers other than phosphate (hydrogen carbonates, sodium chloride, etc.) and dry sands.
- Unsuitable extinguishing media : None in particular
- Fire-Specific Hazards : If in a form of powder: May be ignited by heat, sparks and flame.
- Specific Fire-Fighting Method : Eliminate combustion sources at the origin of fire and put out fire by using extinguishing media.
Move movable containers immediately to a safe place.
- Protection of Fire-Fighters : Wear appropriate compressed air open-circuit self-contained breathing apparatus and protective clothing (heat-resistant).

6. Accidental Release Measures

- Personal Precaution : Immediately remove potential ignition sources from surrounding areas.
Make fire-extinguishing tools available to prepare for fire ignition.
- Personal Protective Equipment and Emergency Procedures : Ventilate affected areas thoroughly, if it is in an indoor environment, until the clean-up operation is completed.
Wear appropriate personal protective equipment during the operation to avoid skin contact of splash etc. and inhalation of dust and gas.
- Environmental Precautions : Take precautions to prevent leaked materials from draining into rivers etc. to adversely impact the environment. Make it sure to appropriately treat contaminated wastewater in order to prevent untreated wastewater from being released into the surrounding environment.
- Recovery and Neutralization : Collect leaked materials and then rinse away the remains with plenty of water.
- Prevention of Secondary Disaster : -

7. Handling and Storage

- Handling
- Engineering Precautions : Take the measures stipulated in “8. Exposure Controls/Personal Protection” and wear personal protective equipment as necessary.
Install facilities to rinse eyes and to wash hands and body in the vicinity of a place handling this reference material as necessary.
- Local and General Ventilation : Provide local and general ventilation as necessary.
- Precautions for Safe Handling : Use appropriate personal protective equipment when handling.
Use eye protection when processing.
Do not breathe dust.
This reference material is flammable if it is in a form of powder:
Immediately remove potential ignition sources from surrounding areas.
Make fire-extinguishing tools available to prepare for fire ignition

Storage

- Appropriate Storage : Protect from direct sunlight. Store in closed container.
- Conditions : Store in nitrogen ambience at temperatures between 5 °C and 35 °C.
- Safe Container : Plastic
- Packaging Material

※ See the Certificate for the details on appropriate storage conditions and instructions for use as a reference material.

8. Exposure Controls/Personal Protection

Administrative levels

Not established

Occupational exposure limit (Silicon, tungsten)

- ACGIH TLV-TWA : —
- Japan Society for Occupational Health Recommended Reference Value : —
- OSHA PEL TWA : —

Engineering Controls

- Ventilation/Exhaust : Local ventilation equipment or general ventilation equipment
Keep equipment tightly closed or install local ventilation equipment in order to avoid exposure.
- Safety Control/Gas Detection : —
- Storage Precautions : Protect from direct sunlight. Store in closed container.
Store in nitrogen ambience at temperatures between 5 °C and 35 °C.

Personal Protective Equipment

- Respiratory System : Wear appropriate personal protective equipment for respiratory system such as mask.
- Hands : Wear appropriate personal protective equipment such as protective gloves in order to avoid injuries caused by sharp fractions, etc.
- Eyes : Safety goggles
Wear appropriate eye protection.
- Skin and Body : Wear appropriate personal protective equipment such as face shield and protective clothing.

Hygiene Measures

Handle this reference material in accordance with the industrial health and safety codes.

9. Physical and Chemical Properties

- Appearance, etc. : Solid
- Color : Dark grey
- Odor : Odorless
- pH : No data
- Melting point : 1410 °C (Si)
- Boiling point : 2355 °C (Si)
- Flashing point : No data
- Explosive range : No data

Vapor pressure	: No data
Relative vapor density(Air=1)	: No data
Specific gravity or bulk specific gravity	: 2.33 g/cm ³ (Si)
Solubility	: Soluble in aqua regia, nitric acid including hydrogen fluoride, and hydrogen sulfide.
<i>n</i> -Octanol/water partition coefficient (Log Po/w)	: No data
Auto-ignition temperature	: No data
Decomposition temperature	: No data
Flammability	: Silicon powder flammable metal powder.

10. Stability and Reactivity

Stability	: Stable under normal condition
Reactivity	: Reacts with oxygen at over 400 °C and nitrogen at over 1000 °C to produce silicon oxide and silicon nitride. Reacts with water at high temperature to liberate explosive hydrogen gas. Dissolved in aqua regia, nitric acid containing hydrogen fluoride, sodium hydroxide solution.
Possibility of hazardous reactions	: Silicon powder is a flammable metal powder and may react with water and air.
Conditions to avoid	: Heat, mixing with air in a powder or granular form.
Incompatible materials	: Halogen, metal carbonate, metal acetyl ide, metal hexafluoride
Hazardous decomposition products	: Hydrogen

11. Toxicological information

Acute toxicity	:
Acute toxicity(Oral)	: Not classified Based on the data, Rat LD50=3160 mg/kg bw(IUCLID(2000)), it was out of the category of GHS classification criteria.
Acute toxicity(Skin)	: No data
Acute toxicity (Inhalation, dust/mist)	: No data
Skin corrosivity/irritation	: No data
Severe damage to eyes/ eye irritation	: Tungsten powder and silicon powder is eye irritating.
Respiratory sensitization	: No data
Skin sensitization	: No data
Germ cell mutagenicity	: No data

Carcinogenicity	: No data
Reproductive toxicity	: No data
Specific organ toxicity/(single exposure)	: Not applicable
Specific organ toxicity/(repeated exposure)	: No data
Aspiration hazard	: Not applicable

※ The toxicological information is based on the information on raw materials as information on the mixture is not available.

12. Ecological Information

Hazardous to the aquatic environment, short-term (Acute)	: No data available
Hazardous to the aquatic environment, long-term (Chronic)	: No data available
Ecotoxicity	: No data available
Persistence and Degradability	: No data available
Bioaccumulation	: No data available
Mobility in soil	: No data available
Ozone depletion potential	: No data available

13. Disposal Considerations

Residual Waste	: Dispose of this reference material in accordance with applicable legislation and local government ordinance. When the above-mentioned treatments are not possible, entrust disposal of residual waste to a professional waste disposal company licensed by prefectural governor.
Contaminated Container and Package	: Disposal of the empty container should be after the complete removal of the content.

14. Transport Information

UN Number	: 1346
UN Classification	: Class 4.1
Material name	: Silicon
Container grade	: Package Grade III
ICAO/IATA	: Not applicable
Marine pollutant	: Not applicable
Precautions	: Transport this reference material carefully while keeping it away from direct sunlight and fire and preventing accidental release due to falling, overturning, etc.

15. Regulatory Information

- No applicable laws and regulations

 - ◎ **This SDS is originally prepared for the use of the material in Japan, thus the stated laws and regulations are stipulated and carried out in Japan. The use of the material in other countries should be referred to and by application of the relevant laws and regulations of the country in which the material will be used.**
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16. Other Information

Others

The information in this document is not intended to be exhaustive and is based on currently available information and data. The measures given in this document are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety measures appropriate to each specific application and context of use. This document is intended to provide information and not intended to guarantee anything in handling this reference material.
