Safety Data Sheet

National Institute of Advanced Industrial Science and Technology
AIST

1. Identification of the Substance/Mixture and of the Supplier

Supplier	:	National Institute of Advanced Industrial Science and Technology (AIST)
Address	:	1-3-1, Kasumigaseki, Chiyoda, Tokyo, Japan
Office in Charge	:	Reference Materials Office, Center for Quality Management of Metrology, National Metrology Institute of Japan
Person in Charge	:	Certified Reference Material Staff
Telephone No.	:	+81-29-861-4059 Fax No. : +81-29-861-4009
Emergency Contact	:	Same as above
		Prepared on : March 11, 2008
		Revised on : March 31, 2017
		ID Number : 8005001
Identity of Substance/Mixture	:	Certified reference material: NMIJ CRM 8005-a Fine Silicon Nitride Powder for Fine Ceramics (Liquid Interfacial Reaction)
Recommended Use of the Chemical and Restriction on Use	:	This reference material can be used to control the precision of analysis or to confirm the validity of analytical methods or instruments during the quantitative determination of main constituents and trace elements in silicon nitride. Do not use this reference material for other purposes than testing/research.

2. Hazards Identification

GHS Classification :	Acute toxicity (inhalation: dust and mist)	: Hazard Category 5
GHS Label Element:	Not applicable	
Signal Word :	Warning	
Hazards Statement:	May be harmful if inhaled (dust)	
Other Hazards Statement	:	Silicon dioxide, which is contained in this reference material as an impurity, will get gathered, when entering lungs, at lymphoid tissues, bronchus, blood vessels, etc. and then will gradually penetrate into alveoli to cause chronic bronchitis, rheumatic diseases, coccal pneumonia, etc.
Precautionary Statement	:	［Precaution］ Do not drink, eat or smoke while handling this reference material. Do not use this reference material before reading and understanding all safety precautionary statements. Wash hands thoroughly after handling this reference material. Use personal protective equipment as necessary. Avoid dust inhalation. ［Action］ When inhaling this reference material:Seek medical attention when feeling sick. When feeling sick:Seek medical examination/treatment. When being exposed or when there are concerns about exposure:Seek medical examination/treatment. ［Storage］

Keep this reference material away from direct sunlight, heat and moisture and store it in a clean environment at room temperature.

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

The other hazards than the above do not result in classification or are not covered by the GHS.

3. Composition/Information on Ingredients

Substance/Mixture	:	Mixture
Chemical Identity	:	Silicon nitride
Synonym	:	
Chemical Formula or Structural Formula	:	Si_3N_4
Molecular Weight	:	140.28
CAS number	:	12033-89-5
Content	:	About 98 %
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (1)-493 Industrial Safety and Health Act : -

This CRM contains minor elements shown below;
Cr, Fe, Mn, Mo, Al, Cu, Ni, O, F, Cl, S.

4. First-aid Measures

Eye Contact	:	Flush eyes thoroughly with clean water. Seek medical attention.
Skin Contact	:	Flush exposed areas thoroughly with clean water.
Inhalation	:	Move the person to fresh air and keep him/her at rest and warm. Seek medical attention. If the person has an anamnesis (e.g. asthma, bronchitis), it may get worsened due to dust exposure. Impact of dust exposure on smokers is more serious than that on non-smokers. In addition, compared with non-smokers, smokers may be vulnerable to dust exposure even at a lower dust concentration.
Ingestion	:	Flush mouth thoroughly and make the person vomit. Immediately seek medical attention. Do not make him/her drink or eat anything if he/she is unconscious.
Expected Acute and Delayed Symptoms	:	-
Most Important effects/Symptoms	:	-
Protection of the Persons Taking First-Aid Measures	:	Use personal protective equipment.

5. Fire-fighting Measures

Extinguishing Media	:	General extinguishing media; This reference material may emit

		ammonia gas due to hydrolysis when it contacts with water at high temperature. Exercise considerable caution, therefore, when pouring or sprinkling water to large amount of this reference material.
Fire-Specific Hazards	:	Noninflammable
Specific Fire-Fighting Method	:	Eliminate combustion sources at the origin of a fire and put out fire by using extinguishing media. Move movable containers immediately to a safe place. In the case of immovable containers, cool their surroundings with sprayed water.
Protection of Fire-Fighters	:	Carry out fire-fighting from the windward in order to avoid inhalation of hazardous gas (ammonia). Use personal protective equipment such as fireproof clothing, eye protector and oxygen mask.

6. Accidental Release Measures

Personal Precaution	:	-
Personal Protective Equipment and Emergency Procedures	:	This reference material may emit hazardous gas when being released to warm water. Ventilate the affected area thoroughly until the clean-up operation is completed. Avoid dust inhalation during the clean-up operation.
Environmental Precautions	:	Take precautions to prevent the spilled silicon nitride from draining into rivers 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 spilled silicon nitride in empty containers by using vacuum cleaner etc.
Secondary Disaster Prevention Measures	:	Mark the restricted area with rope etc. to keep out unauthorized people. Carry out the clean-up operation from the windward and make people on the leeward side evacuate.

7. Handling and Storage

Handling

Engineering Precautions	:	Avoid contact with scattered dust. Use dust protective mask, eye protector and protective gloves.
Local and General Ventilation	:	Handle this reference material in a well-ventilated place as much as possible.
Precautions for Safe Handling	:	Avoid rough handling such as turning over, dropping, giving a shock to or dragging containers. Prevent spill, overflow and scattering. Wash hands, face etc. thoroughly and gargle after handling this reference material. Use appropriate personal protective equipment to avoid inhalation, eye contact, skin contact and adhesion to clothing. Use local ventilation system when handling this reference material in an indoor environment. Prevent this reference material from contacting with water.

Storage

Appropriate Storage Conditions	:	Keep this reference material away from direct sunlight, heat and moisture and store it in a clean environment at room temperature
Safe Container Packaging Material	:	Glass

8. Exposure Controls/Personal Protection

Cut-Off Value/Concentration Limit

Not specified

Permissible Concentration (Silicon Nitride)

・ACGIH TLV-TWA (2003)	:	Total dust＝10 mg/m^3 Inhalable dust＝3 mg/m^3
・Values recommended by Japan Society for Occupational Health (2003)	:	Type III dust Total dust＝8 mg/m^3 Inhalable dust＝2 mg/m^3

Permissible Concentration (Amorphous Silica)

・ACGIH TLV-TWA (2003)	:	Fume: 2.0 mg/m^3 Fused: 0.1 mg/m^3
・Values recommended by Japan Society for Occupational Health (2003)	:	Type II dust Total dust＝4 mg/m^3 Inhalable dust＝1 mg/m^3
・OSHA PEL TWA	:	20 mppcf　0.8 mg/m^3

Engineering Controls

Ventilation	:	It is necessary to use personal protective equipment or to install local ventilation system when actual concentrations may exceed the above permissible concentrations. It is recommended to use local ventilation together with general ventilation. It must be ensured that appropriate installation of ventilation system has enabled actual concentrations to be kept below the permissible concentrations.
Safety Control	:	-
Gas Detection		
Precautions for Storage	:	Ventilation along floor surface Hermetically-sealed

Personal Protective Equipment (PPE)

PPE for Respiratory System	:	Dust protective mask
PPE for Hands	:	Protective gloves
PPE for Eyes	:	Eye protector
PPE for Skin and Body	:	Protective clothing

Health Precautions

Nothing in particular

9. Physical and Chemical Properties

・Appearance, etc.	:	Fine powder
・Color	:	White
・Odor	:	No data
・pH	:	8 to 10
・Melting point	:	No data
・Boiling point	:	Silicon nitride : None (Get sublimed at about 1900 °C) Amorphous silica: 2230 °C
・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	:	3.18 g/cm^3
・Solubility	:	Insoluble in water
・*n*-Octanol/water partition coefficient (Log Po/w)	:	No data
・Auto-ignition temperature	:	No data

10. Stability and Reactivity

◇ Stability
- ・Thermally stable up to about 1900 °C in an inert ambiance
- ・Chemically stable against light and impact. No self-polymerization

◇ Reactivity
- ・No oxidation reactivity, No self-reactivity
- ・When being heated in an ambience containing water or steam, this reference material emits ammonia gas through slow hydrolytic reaction. The hydrolytic reaction is facilitated more as temperature goes up. The reaction gets severe as temperature exceeds several hundreds of degrees Celsius.

◇ Conditions to Avoid
- ・Avoid storage in hot and humid conditions.
- ・Avoid contact with moisture or strong oxidants.

◇ Hazardous Decomposition Products
- ・Ammonia gas

11. Toxicological Information

Acute Toxicity (Amorphous Silica)	Sprayed Rat Intravenous:LD50＝ 15 mg/kg Melted Rat Oral:LD50＝ 3160 mg/kg Mouse Oral:LD50＝ 9 mg/kg Rabbit Oral:LD50＝ 35 mg/kg
Others	This reference material may emit slight amount of ammonia gas when being mixed with water. Ammonia gas features irritating odor and is strongly irritant and corrosive to skin and mucous membranes.

12. Ecological Information

Persistance and Degradability
- ・Chemically stable. Note that this reference material may move around as it scatters in the air or as it forms suspended solution.

Bioaccumulative Potential
- ・No data available

Ecotoxicity
- ・No data available

13. Disposal Considerations

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

14. Transport Information

UN Number	:	Not applicable
UN Classification	:	Not applicable
UN Proper Shipping Name	:	-
Packing Group	:	-
Marine Pollutant	:	-
Special Precautions	:	Transport this reference material carefully while keeping it away from direct sunlight, fire and moisture and preventing accidental release due to falling, overturning, etc.

15. Regulatory Information

・No applicable laws and regulations

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.