

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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ID Number : 5203001

Identity of Substance/Mixture : Certified reference material: NMIJ CRM 5203-a
 GaAs/AlAs Super Lattice
 Recommended Use of the Chemical and Restriction on Use : This material is intended for use in controlling the precision of analysis or adjusting the measurement condition during the depth-profile analysis by ion-sputtering with Auger electron spectroscopy, X-ray photoelectron spectroscopy and Secondary ion mass spectrometry or for use in controlling the precision of analysis and correcting the equipment during grazing incidence X-ray reflectivity analysis. 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 : Carcinogenic : Class 1A

GHS Label Element:



Signal Word : Danger
 Hazard and toxicity : Carcinogenic
 Other Hazards : Inhalation of gallium arsenide is fatally high toxic; it reacts with the water vapor, acid, acid vapor, and generates arsine.
 Statement :
 Precautionary Statement : [Precaution]
 Read and understand safety notes before use.
 Obtain the instruction manual before use.
 Use personal protective equipment if necessary.
 [Action]
 If swallowed: Give him/her plenty of water and induce vomiting.

Get medical advice/attention in case of abnormalities.
 If contact with skin, eyes, or the other, get medical advice/attention.
 [Storage]
 Store in a clean and dry environment at temperature of 5 °C to 35 °C.
 Storage under nitrogen gas flow is recommended.
 Store the material in locked.
 [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.

The other hazards than the above do not result in classification or
 are not classifiable.

3. Composition/Information on Ingredients

Substance/Mixture : Mixture
 Name : Ultra-thin multilayer of GaAs/AlAs on GaAs substrate

Ingredient 1

Chemical name : Gallium arsenide
 Synonym : GaAs
 Chemical formula : GaAs
 Molecular weight : -
 CAS number : 1303-00-0
 Content : About 99 %
 Reference Number in : Act on the Evaluation of Chemical Substances and Regulation
 Gazetted List in Japan of Their Manufacture, etc. : (1)-580
 Industrial Safety and Health Act : Published

Ingredient 2

Chemical name : Aluminum arsenide
 Synonym : AlAs
 Chemical formula : AlAs
 Molecular weight : -
 CAS number : 22831-42-1
 Content : -
 Reference Number in : Act on the Evaluation of Chemical Substances and Regulation
 Gazetted List in Japan of Their Manufacture, etc. : -
 Industrial Safety and Health Act : -

Content of GaAs : ca. 99 %

This material is layered material with 6 surface layers. The thickness of each layer is certified
 and shown in the table below,

Hazardous component : Gallium arsenide

4. First-aid Measures

- If in eye : Rinse well with clean water. Get medical assistance
- If on skin : Rinse well with clean water. Take off the contaminated clothing and shoes, etc. Get medical assistance.
- If inhaled : Move to a fresh air, rest and keep warm. Give his/her nose a blow and rinse well inside the mouth. Perform artificial respiration in case of difficulty of breathing.
- If swallowed : Do not induce vomiting. Get medical assistance.
- Anticipated acute and delayed symptoms : -
- Measures to protect the person applying emergency first aid: : Use personal protective equipment.

5. Fire-fighting Measures

- Extinguishing Media : Use dry chemical extinguisher and CO₂ extinguisher. Do not use water. In case of surrounding fire, move the container of this material to safety place. If the container of this material is not movable, cool down the container of this material and the peripherals.
- Fire-Specific Hazards : Be careful about the generation of toxic gas, fume and smoke in case of fire.
- Specific Fire-Fighting Method : Eliminate ignition sources at the origin of a fire and put out fire by using appropriate extinguishing media. In case of surrounding fire, move the container of this material to safety place immediately.
- Protection of Fire-Fighters : Use personal protective equipment such as fireproof clothing, heat-resistant clothing, protective clothing, fireproof gloves, and compressed air open-circuit self-contained breathing apparatus.

6. Accidental Release Measures

- Personal Precaution : Eliminate ignition sources at the origin of a fire immediately.
- Personal Protective Equipment and Emergency Procedures : Ventilate the affected areas thoroughly, if it is in an indoor environment, until the clean-up operation is completed. Use 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 spillage 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 scattered fractions in empty containers which can be tightly closed. Be careful not to wind the dust.
- Prevention of Secondary Disaster : -

7. Handling and Storage

Handling

- Engineering : Avoid contact with strong acid or strong oxidizing agent. Thermal decomposition of this material may cause generation of toxic fume of arsenic oxide (III) which shows strong hemolytic action.
- Precautions
- Local and General Ventilation : Use local ventilation system in indoor handling area.
- Precautions for Safe Handling : Avoid rough handling such as turning over, dropping, giving a shock to or dragging containers. Prevent spill, overflow and scattering, and avoid vapor generation. Keep container tightly closed after use. Wash hands, face etc. thoroughly and gargle after handling this reference material. Do not bring gloves and other contaminated personal protective equipment into staff room. Use appropriate personal protective equipment to avoid inhalation and contact with eyes, skin and clothing.

Storage

- Appropriate Storage Conditions : Store this material away from the heat source and origin of a fire. Store under clean and dry environment with normal room temperature.
- Safe Container : plastic container
- Packaging Material

8. Exposure Controls/Personal Protection

Threshold Limit Value

- less than 0.01 mg/L (Sb) (groundwater and elution)
- less than 0.1 mg/L (As) (drainage)

Permissible Concentration (Gallium arsenide)

- ACGIH TLV-TWA : TWA 0.0003 mg/m³ (R)

Facility engineering

- Ventilation/Exhaust : Local ventilation system or General ventilation system
- Safety management : -
- /gas detector

- Storage Precaution : -

Personal Protective Equipment (PPE)

- Respiratory System : Compressed air open-circuit self-contained breathing apparatus.
- Hands : Protective gloves
- Eyes : Eye protector

Skin and Body : Protective clothing, Face protection

9. Physical and Chemical Properties

- Appearance, etc. : Thin plate of about 15 mm square
- Color : No data
- Odor : No data
- pH : No data
- Melting point : No data
- Boiling point : No data
- 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 : No data
- Solubility : No data
- *n*-Octanol/water partition coefficient (Log *P*_{o/w}) : No data
- Auto-ignition temperature : No data

10. Stability and Reactivity

- ◇Stability
 - Stable under normal condition
- ◇Reactivity
 - If react with acid, arsine may occur.
- ◇Conditions to avoid
 - Sunlight, heat, humidity
- ◇Hazardous decomposition products
 - If decomposed by heat, toxic vapor of As may occur.

11. Toxicological Information

Carcinogenic (GaAs) A3:Carcinogenic for animals was demonstrated, but it is not proved for relevance to human cancer (ACGIH tolerable concentration in work place, evaluation for carcinogenicity)
1:Carcinogenic for human (IARC evaluation for carcinogenicity)

12. Ecological Information

Degradability, concentration

- No data available

Bioaccumulation

- No data available

Ecotoxicity

- No data available

13. Disposal Considerations

- Disposal in compliance with the relevant laws and regulations as well as the ordinances of the local government.

14. Transport Information

UN Number	: Not applicable
UN	: Not applicable
Classification	
Shipping Name	: GaAs/AIAs on GaAs
Packing Group	: –
Marine	: No data
Pollutant	
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

- ◇Pollutant Release and Transfer Register (PRTR) Law
 - Class 1 Designated Chemical Substance
- ◇Air Pollution Control Law
 - Hazardous air pollutant (Substances of priority concern)

16. Other Information

Other

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.
