1. Identification of the Substance/Mixture and 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

Identify of Substance/Mixture: Certified reference material: NMIJ CRM 6019-a
Recommended Use of the Chemical and Restriction on Use: L-Tyrosine
This reference material can be used, in amino acid analysis, for preparation of standard solution, calibration of analysis equipment and verification of analysis method/equipment. Do not use this reference material for other purposes than testing/research.

2. Hazards Identification

GHS Classification: Cannot be classified
GHS Label Element: -
Signal Word: -
Hazard Statement: -
Other Hazards: Harmful if inhaled or orally ingested in large amounts
Precautionary Statement:

Use appropriate personal protective equipment so as to avoid inhalation and contact with eyes, skin and clothing.

First-Aid Measure
If inhaled: Remove victim to fresh air. Make victim gargle thoroughly. Get medical advice/attention if symptoms are observed.
If on skin: Rinse away with plenty of soap and water. Get medical advice/attention if inflammation is observed.
If in eyes: Rinse away immediately with plenty of water for 15 minutes or more. Get medical advice/attention if there is any problem.
If ingested: Rinse mouth thoroughly with water. Make victim drink a couple glasses of water or milk to induce vomiting. Get medical advice/attention immediately.

Storage
Store in clean desiccator in a light-shielded environment at room temperature (15 °C to 25 °C).

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

<table>
<thead>
<tr>
<th>Substance/Mixture</th>
<th>Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Identity</td>
<td>L-Tyrosine</td>
</tr>
<tr>
<td>Synonym</td>
<td>(S)-2-amino-3-(4-hydroxy-phenyl) propionic acid</td>
</tr>
<tr>
<td>Content</td>
<td>99.9 % or more</td>
</tr>
<tr>
<td>Chemical Formula or Structural Formula</td>
<td>C₉H₁₁NO₃</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>181.19</td>
</tr>
<tr>
<td>Content</td>
<td>99.9 % or over</td>
</tr>
<tr>
<td>Reference Number in Gazetted List in Japan</td>
<td>Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.</td>
</tr>
<tr>
<td></td>
<td>Industrial Safety and Health Act</td>
</tr>
<tr>
<td></td>
<td>CAS Number</td>
</tr>
</tbody>
</table>

### 4. First-aid Measures

If in Eyes: Rinse away immediately with plenty of water for 15 minutes or more. Get medical advice/attention if there is any problem.

If on Skin: Rinse away with plenty of soap and water. Get medical advice/attention if inflammation is observed.

If Inhaled: Remove victim to fresh air. Make victim gargle thoroughly. Get medical advice/attention if symptoms are observed.

If Ingested: Rinse mouth thoroughly with water. Make victim drink a couple glasses of water or milk to induce vomiting. Get medical advice/attention immediately.

Measures to be taken to protect the person applying first aid: Use personal protective equipment.

### 5. Fire-fighting Measures

Extinguishing Media: Water spray, Powder, Foam, Carbon dioxide (CO₂), Dry sand

Fire-Specific Hazards: As irritating or toxic gas is generated in the case of fire, use appropriate personal protective equipment to avoid breathing it.

Specific Fire-Fighting Method: Eliminate ignition sources at the origin of a fire and put out fire by using extinguishing media. Remove movable containers promptly 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 breathing hazardous gas. Use personal protective equipment such as compressed air open-circuit self-contained breathing
apparatus as necessary. Make it sure to use personal protective equipment during fire-fighting operation.

6. Accidental Release Measures

| Personal Precaution, 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 Prevention of Secondary Disaster | Collect spillage in empty containers. Rinse away the remains with plenty of water. 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 | Nothing special |
| Precautions | Avoid rough handling such as turning over, dropping, giving a shock to or dragging containers. Prevent spill, overflow and scattering, and avoid dust and vapor generation. Keep container tightly closed after using this reference material. Wash hands, face etc. thoroughly and gargle after handling this reference material. Restrict drinking, eating and smoking to a designated area. Do not bring gloves and other contaminated personal protective equipment into staff room. Make a place handling this reference material a restricted area to keep out unauthorized people. |
| Precautions for Safe Handling | Use appropriate personal protective equipment to avoid inhalation and contact with eyes, skin and clothing. Use local ventilation system when using this reference material in an indoor workplace. |
| Storage Appropriate Storage Conditions Engineering Precautions | Store in clean desiccator in a light-shielded environment at room temperature (15 °C to 25 °C). Nothing special |
Incompatible Substances: No data available
Safe Container Packaging Material: Glass

8. Exposure Controls/Personal Protection

Threshold Limit Value
Permissible Concentration:
- ACGIH TLV-TWA: Not specified
- Values recommended by Japan Society for Occupational Health: Not specified
- OSHA PEL TWA: Not specified

Engineering Controls
Ventilation/Exhaust: Keep container tightly closed and install local ventilation system when dust is generated. Install facilities to rinse eyes and to wash hands and body in the vicinity of a place handling this reference material and label them.

Safety control/ Gas detection: -

Storage Precautions: Store in a clean light-shielded environment at room temperature (15 °C to 25 °C).

Personal Protective Equipment (PPE)
- Respiratory System: Dust protective mask
- Hands: Protective gloves
- Eyes: Eye protector (Goggle type as necessary)
- Skin and Body: Protective clothing with long sleeves

Hygiene measure: Treat in accordance with rules on Industrial hygiene and Industrial safety.

9. Physical and Chemical Properties

- Appearance etc.: Crystalline powder
- Color: White
- Odor: No data available
- pH: No data available
- Melting Point: 342 °C to 344 °C (Decomposition point)
- Boiling Point: No data available
- Flash Point: No data available
- Spontaneous Ignition Point: No data available
- Vapor Pressure: No data available
- Specific Gravity: 1.456
- Solubility: Hardly-soluble in water, Soluble in dilute
9. Physical and Chemical Properties

- **Appearance, etc.**: Crystalline powder
- **Color**: White
- **Odor**: No data
- **pH**: No data
- **Melting point**: 342 °C to 344 °C (Decomposition point)
- **Boiling point**: No data
- **Flashign point**: No data
- **Explosive range**: No data
- **Vapor pressure**: No data
- **Relative vapor density (Air=1)**: No data
- **Specific gravity or bulk specific gravity**: 1.456
- **Solubility**: Hardly-soluble in water, Soluble in dilute hydrochloric acid
- **n-Octanol/water partition coefficient (Log Po/w)**: No data
- **Auto-ignition temperature**: No data

10. Stability and Reactivity

**Stability**
- Stable in normal conditions

**Reactivity**
- No data available

**Conditions to Avoid**
- Sunlight, Heat

**Hazardous Decomposition Products**
- Carbon monoxide (CO), Nitrogen oxide

11. Toxicological Information

**Acute Toxicity**
- Abdominal cavity, Mouse
  - LD50: >1450 mg/kg

12. Ecological Information

**Persistence and Degradability**
- No data available

**Bioaccumulative Potential**
- No data available

**Ecotoxicity**
- No data available

13. Disposal Considerations
Residual Waste
Residual Waste : Incineration method
Incinerate in an incinerator equipped with scrubber.
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
Contaminated Container and Package : Dispose of containers after thoroughly removing their contents.

14. Transport Information
UN Number : Not applicable
UN Classification : Not applicable
Shipping Name : -
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

16. Other Information
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.