1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Tris(2,2'-bipyridine)dichlororuthenium(II) hexahydrate

Product Number: 93307
Brand: Fluka
Company: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA
Telephone: +1 800-325-5832
Fax: +1 800-325-5052
Emergency Phone #: (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: Tris(2,2'-bipyridyl)ruthenium(II) chloridehexahydrate
Ruthenium-tris(2,2'-bipyridyl) dichloride

Formula: C_{30}H_{24}Cl_{2}N_{6}Ru · 6H_{2}O
Molecular Weight: 748.62 g/mol

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tris(2,2'-bipyridyl)dichlororuthenium(II)hexahydrate</td>
<td>50525-27-4</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
No known OSHA hazards

HMIS Classification

Health Hazard: 0
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 0
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Flammable properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>no data available</td>
</tr>
<tr>
<td>Ignition temperature</td>
<td>no data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suitable extinguishing media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special protective equipment for fire-fighters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear self contained breathing apparatus for fire fighting if necessary.</td>
</tr>
</tbody>
</table>

6. ACCIDENTAL RELEASE MEASURES

<table>
<thead>
<tr>
<th>Personal precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid dust formation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not let product enter drains.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Methods for cleaning up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweep up and shovel. Keep in suitable, closed containers for disposal.</td>
</tr>
</tbody>
</table>

7. HANDLING AND STORAGE

<table>
<thead>
<tr>
<th>Handling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep container tightly closed in a dry and well-ventilated place. Light sensitive. Store under inert gas.</td>
</tr>
</tbody>
</table>

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

<table>
<thead>
<tr>
<th>Personal protective equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory protection</td>
</tr>
<tr>
<td>Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).</td>
</tr>
</tbody>
</table>
Hand protection
For prolonged or repeated contact use protective gloves.

Eye protection
Safety glasses

Hygiene measures
General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Form crystalline
Colour dark red

Safety data
pH no data available
Melting point > 300 °C (> 572 °F)
Boiling point no data available
Flash point no data available
Ignition temperature no data available
Lower explosion limit no data available
Upper explosion limit no data available
Water solubility no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx), Hydrogen chloride gas, Ruthenium oxide

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Intravenous - mouse - 1.999 mg/kg

Irritation and corrosion
no data available

Sensitisation
no data available

Chronic exposure
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects
- **Inhalation**: May be harmful if inhaled. May cause respiratory tract irritation.
- **Skin**: May be harmful if absorbed through skin. May cause skin irritation.
- **Eyes**: May cause eye irritation.
- **Ingestion**: May be harmful if swallowed.

Additional Information
RTECS: VM2730000

12. ECOLOGICAL INFORMATION

- **Elimination information (persistence and degradability)**
  no data available
- **Ecotoxicity effects**
  no data available
- **Further information on ecology**
  no data available

13. DISPOSAL CONSIDERATIONS

- **Product**
  Observe all federal, state, and local environmental regulations.
- **Contaminated packaging**
  Dispose of as unused product.

14. TRANSPORT INFORMATION

- **DOT (US)**
  Not dangerous goods
- **IMDG**
  Not dangerous goods
- **IATA**
  Not dangerous goods

15. REGULATORY INFORMATION

- **OSHA Hazards**
  No known OSHA hazards
DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

```
Tris(2,2'-bipyridyl)dichloro-ruthenium(II)hexahydrate   CAS-No. 50525-27-4
```

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

```
Tris(2,2'-bipyridyl)dichloro-ruthenium(II)hexahydrate   CAS-No. 50525-27-4
```

New Jersey Right To Know Components

```
Tris(2,2'-bipyridyl)dichloro-ruthenium(II)hexahydrate   CAS-No. 50525-27-4
```

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information
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