Tris(2,2'-bipyridine)dichlororuthenium(II) hexahydrate

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

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

Cat No.: 12783
CAS No: 50525-27-4
Molecular Formula: C30 H24 Cl2 N6 Ru 6 H2 O

Supplier:
Alfa Aesar
Avocado Research Chemicals, Ltd.
Shore Road
Port of Heysham Industrial Park
Heysham, Lancashire LA3 2XY
United Kingdom
Office Tel: +44 (0) 1524 850506
Office Fax: +44 (0) 1524 850608

Emergency Telephone Number
Call Carechem 24 at
+44 (0) 1865 407333 (English only);
+44 (0) 1235 239670 (Multi-language)

E-mail address
uktech@alfa.com
www.alfa.com
Product Safety Department

Recommended Use
Laboratory chemicals.

Uses advised against
No Information available

SECTION 2. HAZARD IDENTIFICATION

Physical State: Solid
Appearance: Red
Odor: No information available

Emergency Overview
The product contains no substances which at their given concentration are considered to be hazardous to health.

Classification of the substance or mixture
Based on available data, the classification criteria are not met

Label Elements
None required

Physical and Chemical Hazards
None identified.

Health Hazards
The product contains no substances which at their given concentration are considered to be hazardous to health.

Environmental hazards
Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants. Will likely be mobile in the environment due to its water solubility. The product is water soluble, and may spread in water systems.

### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tris(2,2'-bipyridyl)ruthenium(II) chloride, hexahydrate</td>
<td>50525-27-4</td>
<td>98</td>
</tr>
</tbody>
</table>

### SECTION 4. FIRST AID MEASURES

**Eye Contact**
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

**Skin Contact**
Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

**Inhalation**
Remove to fresh air. Get medical attention immediately if symptoms occur.

**Ingestion**
Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

**Most important symptoms and effects**
None reasonably foreseeable.

**Self-Protection of the First Aider**
No special precautions required.

**Notes to Physician**
Treat symptomatically.

### SECTION 5. FIRE-FIGHTING MEASURES

**Suitable Extinguishing Media**

**Extinguishing media which must not be used for safety reasons**
No information available.

**Specific Hazards Arising from the Chemical**
This material poses an explosion hazard.

**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions**
Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

**Environmental Precautions**
Should not be released into the environment. See Section 12 for additional Ecological Information.
Methods for Containment and Clean Up
Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

Refer to protective measures listed in Sections 8 and 13.

SECTION 7. HANDLING AND STORAGE

Handling
Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage
Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

Specific Use(s)
Use in laboratories

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents. MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

Exposure Controls

Engineering Measures
None under normal use conditions.

Personal protective equipment

<table>
<thead>
<tr>
<th>Eye Protection</th>
<th>Hand Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear safety glasses with side shields (or goggles) (European standard - EN 166)</td>
<td></td>
</tr>
<tr>
<td>Protective gloves</td>
<td></td>
</tr>
</tbody>
</table>

| Disposable gloves Breakthrough time Glove thickness EU standard Glove comments |
|----------------|----------------|-----------------|----------------|----------------|
| See manufacturers recommendations - EN 374 (minimum requirement) |

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves.

(Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

Skin and body protection
Wear appropriate protective gloves and clothing to prevent skin exposure

Respiratory Protection
No protective equipment is needed under normal use conditions.

Large scale/emergency use
Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

Recommended Filter type: Particle filter

Small scale/Laboratory use
Maintain adequate ventilation
**Hygiene Measures**  
Handle in accordance with good industrial hygiene and safety practice.

**Environmental exposure controls**  
No information available.

### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Red</td>
</tr>
<tr>
<td><strong>Physical State</strong></td>
<td>Solid</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Odor Threshold</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Melting Point/Range</strong></td>
<td>&gt; 300 °C / 572 °F</td>
</tr>
<tr>
<td><strong>Softening Point</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Boiling Point/Range</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Flash Point</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Evaporation Rate</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Flammability (solid,gas)</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Explosion Limits</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapor Pressure</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapor Density</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Specific Gravity / Density</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Bulk Density</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Water Solubility</strong></td>
<td>Soluble</td>
</tr>
<tr>
<td><strong>Solubility in other solvents</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Partition Coefficient (n-octanol/water)</strong></td>
<td>No data available</td>
</tr>
</tbody>
</table>

| **Method** | No information available |
| **Solid**  |                           |

| **Autoignition Temperature**    | No data available           |
| **Decomposition Temperature**   | No data available           |
| **Viscosity**                   | Not applicable              |
| **Explosive Properties**        | No information available    |
| **Oxidizing Properties**        | No information available    |

**Molecular Formula**  
C30 H24 Cl2 N6 Ru . 6 H2 O

**Molecular Weight**  
748.63

### SECTION 10. STABILITY AND REACTIVITY

**Stability**  
Stable under normal conditions.

**Hazardous Reactions**  
None under normal processing.

**Hazardous Polymerization**  
Hazardous polymerization does not occur.

**Conditions to Avoid**  
Exposure to light. Incompatible products.

**Materials to avoid**  
Strong oxidizing agents.

**Hazardous Decomposition Products**  

### SECTION 11. TOXICOLOGICAL INFORMATION

**Product Information**  
No acute toxicity information is available for this product

(a) acute toxicity;  
No data available

(b) skin corrosion/irritation;  
No data available
(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;
   Respiratory No data available
   Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity;
   There are no known carcinogenic chemicals in this product
   No data available

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available
   Target Organs No information available.

(j) aspiration hazard; Not applicable
   Solid

Other Adverse Effects The toxicological properties have not been fully investigated.

Symptoms / effects, both acute and delayed No information available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants.

Persistence and Degradability
   Persistence Soluble in water, Persistence is unlikely, based on information available.

Bioaccumulative Potential Bioaccumulation is unlikely

Mobility in soil The product is water soluble, and may spread in water systems. Will likely be mobile in the environment due to its water solubility. Highly mobile in soils

Endocrine Disruptor Information
   This product does not contain any known or suspected endocrine disruptors

Persistent Organic Pollutant This product does not contain any known or suspected substance

Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 13. DISPOSAL CONSIDERATIONS

Waste from Residues/Unused Chemical waste generators must determine whether a discarded chemical is classified as a
Products
hazardous waste. Consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Contaminated Packaging
Empty remaining contents. Dispose of in accordance with local regulations. Do not re-use empty containers.

Other Information
Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14. TRANSPORT INFORMATION

Road and Rail Transport
Not Regulated

IMDG/IMO
Not regulated

IATA
Not regulated

Special Precautions for User
No special precautions required

SECTION 15. REGULATORY INFORMATION

International Inventories
X = listed. China (IECSC), Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), Korea (KECL).

<table>
<thead>
<tr>
<th>Component</th>
<th>The Inventory of Hazardous Chemicals (2015 Edition)</th>
<th>List of dangerous goods GB 12268 - 2012</th>
<th>TCSI</th>
<th>IECSC</th>
<th>EINECS</th>
<th>TSCA</th>
<th>DSL</th>
<th>PICCS</th>
<th>ENCS</th>
<th>ISHL</th>
<th>AICS</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tris(2,2'-bipyridine)dichlororuthenium(II)hexahydrate</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

National Regulations

SECTION 16. OTHER INFORMATION

Prepared By
Health, Safety and Environmental Department

Creation Date
07-May-2010

Revision Date
07-Jan-2021

Revision Summary
Not applicable.

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Legend
CAS - Chemical Abstracts Service
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic
ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals
TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative
ILO - International Labour Organization
ATE - Acute Toxicity Estimate
VOC (volatile organic compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet