



# MATERIAL SAFETY DATA SHEET

## 1. Product and Company Identification

**Material name** cis-bis-(2,2'-BIPYRIDINE) RUTHENIUM (II) CHLORIDE, HYDRATE  
**Catalog #** 2791  
**Version #** 01  
**Revision date** 27-Jun-2008  
**CAS #** 98014-14-3  
**Synonym(s)** BIS-(2,2'-BIPYRIDINE) RUTHENIUM CHLORIDE  
**Manufacturer information** GFS Chemicals, Inc.  
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## 2. Hazards Identification

**Emergency overview** Irritating to eyes. May be harmful if swallowed.  
**OSHA regulatory status** This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).  
**Potential health effects**  
**Routes of exposure** Eye contact. Inhalation. Ingestion.  
**Eyes** Causes eye irritation.  
**Skin** This product may cause irritation to the skin.  
**Inhalation** May be harmful by inhalation.  
**Ingestion** May be harmful if swallowed.  
**Potential environmental effects** Ecological injuries are not known or expected under normal use.

## 3. Composition / Information on Ingredients

Components	CAS #	Percent
cis-bis-(2,2'-BIPYRIDINE) RUTHENIUM (II) CHLORIDE, HYDRATE	98014-14-3	90 - 100

## 4. First Aid Measures

**First aid procedures**  
**Eye contact** Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation persists get medical attention.  
**Skin contact** Rinse skin with water/shower. Get medical attention if irritation develops or persists.  
**Inhalation** If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.  
**Ingestion** Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.  
**General advice** Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire Fighting Measures

**Flammable properties** Not a fire hazard. The product is not flammable.  
**Extinguishing media**  
**Suitable extinguishing media** Water. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO<sub>2</sub>). Use extinguishing agent suitable for type of surrounding fire.

## Protection of firefighters

**Specific hazards arising from the chemical** Fire may produce irritating, corrosive and/or toxic gases.

**Protective equipment and precautions for firefighters** Use water spray to cool unopened containers. Cool containers with flooding quantities of water until well after fire is out.

**Specific methods** In the event of fire, cool tanks with water spray. Use water spray to cool unopened containers.

## 6. Accidental Release Measures

**Personal precautions** Local authorities should be advised if significant spillages cannot be contained. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep unnecessary personnel away. Stay upwind. Keep out of low areas.

**Environmental precautions** Prevent further leakage or spillage if safe to do so.

**Methods for containment** Prevent entry into waterways, sewers, basements or confined areas.

**Methods for cleaning up** Sweep up or gather material and place in appropriate container for disposal. Avoid dust formation. After removal flush contaminated area thoroughly with water.

## 7. Handling and Storage

**Handling** Avoid contact with eyes. Use only with adequate ventilation. Wear personal protective equipment. Wash thoroughly after handling. Handle and open container with care.

**Storage** Keep container tightly closed. Use care in handling/storage.

## 8. Exposure Controls / Personal Protection

**Engineering controls** Ensure adequate ventilation, especially in confined areas.

### Personal protective equipment

**Respiratory protection** No personal respiratory protective equipment normally required.

**Hand protection** Not normally needed.

**Eye / face protection** Avoid contact with eyes. Wear chemical goggles.

**Skin protection** No special protective equipment required.

**General hygiene considerations** Avoid contact with eyes. Avoid contact with skin.

## 9. Physical & Chemical Properties

**Appearance** Crystalline. Powder.

**Color** Black. or Grey.

**Odor** Slight.

**Odor threshold** Not available.

**Physical state** Solid.

**Form** Solid.

**pH** Not available.

**Melting point** Not available.

**Freezing point** Not available.

**Boiling point** Not available.

**Flash point** Not available.

**Evaporation rate** Not available.

**Flammability** Not available.

**Flammability limits in air, upper, % by volume** Not available.

**Flammability limits in air, lower, % by volume** Not available.

**Vapor pressure** Not available.

**Vapor density** Not available.

**Specific gravity** Not available.

<b>Relative density</b>	Not available.
<b>Solubility (water)</b>	Insoluble
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Molecular weight</b>	484.3600
<b>Molecular formula</b>	(C10H8N2)2RuCl2.xH2O

## 10. Chemical Stability & Reactivity Information

<b>Chemical stability</b>	Stable at normal conditions.
<b>Incompatible materials</b>	Oxidizing agents.
<b>Hazardous decomposition products</b>	Irritating and/or toxic fumes and gases may be emitted upon the products decomposition.

## 11. Toxicological Information

<b>Toxicological information</b>	The toxicological properties have not been fully investigated.
<b>Local effects</b>	Irritating to eyes.
<b>Carcinogenicity</b>	No carcinogenicity data available for this product.

## 12. Ecological Information

<b>Ecotoxicity</b>	This product has no known eco-toxicological effects.
<b>Persistence and degradability</b>	Not available.

## 13. Disposal Considerations

<b>Disposal instructions</b>	After recovery of precious metals dispose of in compliance with local regulations. This product, in its present state, when discarded or disposed of, is not a hazardous waste according to Federal regulations (40 CFR 261.4 (b)(4)). Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. Dispose in accordance with all applicable regulations.
<b>Waste from residues / unused products</b>	Not applicable.

## 14. Transport Information

### DOT

Not regulated as dangerous goods.

## 15. Regulatory Information

<b>US federal regulations</b>	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. CERCLA/SARA Hazardous Substances - Not applicable. Not listed on TSCA
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### CERCLA (Superfund) reportable quantity

None

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

<b>Hazard categories</b>	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
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**Section 302 extremely hazardous substance** No

**Section 311 hazardous chemical** Yes

**Inventory status**

<b>Country(s) or region</b>	<b>Inventory name</b>	<b>On inventory (yes/no)*</b>
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of New and Existing Chemicals (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

**State regulations**

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

**16. Other Information****Further information**

HMIS® is a registered trade and service mark of the NPCA.

**HMIS® ratings**

Health: 2  
Flammability: 0  
Physical hazard: 0

**NFPA ratings**

Health: 0  
Flammability: 0  
Instability: 0

**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.

**Issue date**

27-Jun-2008