Section 1: Company and Product Identification

Product Name: Dichlorobis(2,2-bipyridine)ruthenium(II) dihydrate

Product Code: 8036

Company: Colonial Metals, Inc.
Building 20
505 Blue Ball Road
Elkton, MD 21921 United States

Company Contact: EHS Director
Telephone Number: 410-398-7200
FAX Number: 410-398-2918
E-Mail: info@colonialmetals.com
Web Site: www.colonialmetals.com

Emergency Supplier Emergency Contacts & Phone Number
Response: Chemtrec: 800-424-9300

World Wide - Call COLLECT to U.S. 703-527-3887

Section 2: Hazards Identification

Hazard Pictograms:

Signal Word: Warning

Hazard Category: Acute tox, oral Cat 5
Skin corrosion/irritation Cat 3
Serious eye damage/eye irritation Cat 3
Specific target organ tox, single exp. Cat 3 (narcotic effects)

Hazard Statements:
H303: May be harmful if swallowed
H316: Causes mild skin irritation
H320: Causes eye irritation
H336: May cause drowsiness or dizziness

Precautionary Statements:
P260: Do not breathe dust/fume/gas/mist/vapors/spray
P264: Wash thoroughly after handling
P270: Do not eat, drink or smoke when using this product
P273: Avoid release to the environment
P272: Contaminated work clothing should not be allowed out of the workplace
P280: Wear protective gloves/protective clothing/eye protection/face protection
P501: Dispose of contents/container in accordance with local/regional/national/international rules.

Hazards not otherwise classified:
To the best of our knowledge, the chemical, the physical, and toxicological properties of this compound have not been thoroughly investigated.

Section 3: Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Hazardous substance (name)</th>
<th>Hazard Category</th>
<th>CAS#</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dichlorobis(2,2-bipyridine)ruthenium(II) dihydrate</td>
<td>Irritant</td>
<td>15746-57-3</td>
<td>98 - 100</td>
</tr>
</tbody>
</table>

Chemical Family: Platinum group organometallic complex
Chemical Formula: $C_{20}H_{16}N_4Cl_2Ru$
Section 4: First Aid Measures

**General Info:** Consult a Physician. Show this safety data sheet to the doctor in attendance.

**Notable Exposure symptoms:**
- **If ingested:** Rinse mouth. Seek immediate medical attention. Clear the airway and administer artificial respiration if not breathing. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Seek medical attention immediately.
- **If inhaled:** Remove the victim from the contaminated area while protecting yourself from exposure by wearing an appropriate respirator. Put a similar respirator on the victim if possible. Get medical attention immediately.
- **Eye contact:** Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses if present and easy to do. If discomfort occurs or persists, contact a physician immediately.
- **Skin contact:** Flush area for 15 minutes with water and wash with soap and water. Remove contaminated clothing and shoes and wash before reuse.

Section 5: Fire Fighting Measures

**General Info:** Use NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.

**Extinguishing Method / Equipment:** Carbon dioxide, dry powder or foam

**Hazardous Decomposition Info:** Carbon monoxide, nitrogen oxides, hydrogen chloride, and ruthenium chloride

Section 6: Accidental Release Measures

**Personal precautions, protective equipment and procedures:** Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate respiratory protective equipment and clothing during clean-up. Avoid breathing dust. Ventilate area if easy to do so. Contact local authorities if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Containment:** Small spills can be mixed with vermiculite, powdered limestone, or powdered sodium bicarbonate and swept up and placed in a bag for reclaim or waste disposal. Avoid raising dust. Ventilate area and wash spill site after pick up is complete.

**Cleanup Procedures:** Contain spillage and then collect with an electrically protected vacuum cleaner or by wet brushing and place in container for disposal according to local regulations.

Section 7: Handling and Storage

**Safe Handling Precautions:** Do not handle until all safety precautions have been read and understood. Keep containers tightly closed. Ensure adequate ventilation. Avoid breathing dust/vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Wear appropriate personal protective equipment and wash thoroughly after handling. Keep away from ignition sources. Keep away from heat and direct sunlight.

**Recommendations for Storage:** Store in cool, dry area in a tightly closed product container away from sources of ignition or flame and direct sunlight. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

**Incompatibilities:** Oxidizing agents, halogens and active metals

Section 8: Exposure Control / Personal Protection

**General / Ventilation:** Local Exhaust: Required in handling area

**Engineering Controls:** Mechanical: Desirable to insure concentration of material below TLV/TWA levels

**Work Clothing:** Protective work clothing which covers skin and prevents exposures.

**Eye/face protection:** Wear safety glasses with side shields or goggles or face shield.

**Skin Protection:** Wear chemical resistant gloves.

**Respiratory Protection:** NIOSH approved chemical cartridge respirator for particulates and dust or self-contained breathing apparatus with full face shield.

**Additional Information:** Observe good chemical hygiene practices. Do not smoke or eat while using this product. Wash hands or exposed skin after using the product.
## Section 9: Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Solid</td>
</tr>
<tr>
<td>Melting Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Color</td>
<td>Black</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>N/A</td>
</tr>
<tr>
<td>Odor</td>
<td>N/A</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>Soluble</td>
</tr>
<tr>
<td>Molecular Wt.</td>
<td>484.35 g/mol</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>N/A</td>
</tr>
<tr>
<td>Flash Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Part. Coeff (n-octanol/water)</td>
<td>N/A</td>
</tr>
<tr>
<td>Upper Flam Limits</td>
<td>N/A</td>
</tr>
<tr>
<td>Lower Flam Limits</td>
<td>N/A</td>
</tr>
<tr>
<td>Relative Density</td>
<td>0.600 g/cm³</td>
</tr>
<tr>
<td>Viscosity</td>
<td>N/A</td>
</tr>
<tr>
<td>Autoignition Temp</td>
<td>N/A</td>
</tr>
</tbody>
</table>

## Section 10: Stability and Reactivity

**General:** This product is stable and non-reactive under normal conditions of use. Product is not subject to hazardous polymerization. Avoid open flame and ignition sources.

**Stability:** Stable

**Conditions to Avoid:** Moisture

**Incompatible materials:** Organics, especially acetone and alcohol. Strong oxidizing agents

**Decomposition products:** Carbon oxides, Hydrogen chloride gas, Ruthenium oxide

## Section 11: Toxicological Information

**General Information:** To the best of our knowledge the chemical, physical, and toxicological effects of this compound have not been thoroughly investigated.

**Section 12: Ecological Information**

**General information:** No Data Available

## Section 13: Disposal Information

**Product disposal:** Place in a sealed container. Consult Federal EPA, State and local regulations for proper disposal/recycle/reclamation

**Container disposal:** Treat empty containers with extra care. Consult waste contractor.

## Section 14: Transport Information

**DOT:** Proper Shipping Name:
- Non-Hazardous - Not dangerous goods

**IATA:** Not dangerous goods - Consult IATA before shipping

## Section 15: Regulatory Information

**TSCA:** No Data Available

## Section 16: Other Information

<table>
<thead>
<tr>
<th>NFPA Rating</th>
<th>HMIS Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health: 0</td>
<td>Health: 0</td>
</tr>
<tr>
<td>Fire: 0</td>
<td>Fire: 0</td>
</tr>
<tr>
<td>Reactivity: 0</td>
<td>Reactivity: 0</td>
</tr>
<tr>
<td></td>
<td>Personal Protection: C</td>
</tr>
</tbody>
</table>

**Disclaimer:** In compliance with the OSHA Hazard communication Standard, 2.9 C.F.R 1910.1200, we are providing you with a Materials Safety Data Sheet (MSDS) for the hazardous material you are purchasing.

It is your responsibility to educate your employees on the safe use of the hazardous material. With this in mind, a copy should be forwarded to the supervisor of the user or to the user themselves, and copy should be retained in your files for future reference.

Colonial Metals, Inc. makes no presentation as to the accuracy of the information in the MSDS. The information is believed to be correct; however, you (the customer), should perform your own investigation and independent verification.

If you resell the product, you are responsible to forward the information in the MSDS to your customer.

Colonial Metals, Inc.

**SDS Author:** Dr. Ernest Addo

**Version Date:** 7/31/2015