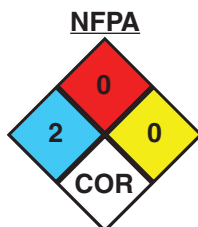


MATERIAL SAFETY DATA SHEET

Ruthenium Dioxide, pre-heat



HMIS

HEALTH	2
FLAMMABILITY	0
REACTIVITY	0
PERSONAL PROTECTION	C

1. Product And Company Identification

Supplier

DF Goldsmith Chemical and Metal
909 Pitner Avenue
Evanston, IL 60202, USA

Telephone Number: 847-869-7800

FAX Number: 847-869-2531

E-mail: goldchem@aol.com

Web Site: www.dfgoldsmith.com

Manufacturer

DF Goldsmith Chemical and Metal
909 Pitner Avenue
Evanston, IL 60202, USA

Telephone Number: 847-869-7800

FAX Number: 847-869-2531

E-mail: goldchem@aol.com

Web Site: www.dfgoldsmith.com

Supplier Emergency Contacts & Phone Number

Chemtrac: 800-424-9300

Supplier Emergency Contacts & Phone Number

Chemtrac: 800-424-9300

Issue Date: 02/23/2007

Product Name: Ruthenium (IV) Oxide Anhydrous

Chemical Name: Ruthenium (IV) Oxide Anhydrous/ Ruthenium Oxide

CAS Number: 12036-10-1

Chemical Family: Platinum Group Metal Salts

Chemical Formula: RuO₂

MSDS Number: 44-032

Product Code: 44-032

2. Composition/Information On Ingredients

Ingredient Name	CAS Number	Percent Of Total Weight
Ruthenium Dioxide	12036-10-1	99-100

EMERGENCY OVERVIEW

Danger! Causes eye irritation. May cause respiratory and digestive tract irritation. May cause skin irritation.

Hygroscopic (absorbs moisture from the air).

Target Organs: Eyes.

Product incompatible with organics, especially acetone and alcohol.

3. Hazards Identification

Primary Routes(s) Of Entry

Eye: Likely

Inhalation: Likely

Skin: Likely

Ingestion: Likely

MATERIAL SAFETY DATA SHEET

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3. Hazards Identification (cont.)

Eye Hazards

Dust may cause mechanical irritation. Causes eye irritation. May cause permanent corneal opacification. May cause chemical conjunctivitis.

Skin Hazards

Irritation

Ingestion Hazards

May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause burns to the gastrointestinal tract. Does not cause serious toxic manifestations

Inhalation Hazards

Inhalation of dust may cause respiratory tract irritation. May cause acute pulmonary edema, asphyxia, chemical pneumonitis, and upper airway obstruction caused by edema.

Chronic/Carcinogenicity Effects

Effects may be delayed.

Conditions Aggravated By Exposure

Causes eye irritation. May cause respiratory and digestive tract irritation. May cause skin irritation. Hygroscopic (absorbs moisture from the air). May cause irritation to the respiratory system. Maintain housekeeping and personal hygiene to minimize exposure and prevent sensitization.

Conditions Aggravated By Overexposure

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

First Aid (Pictograms)



4. First Aid Measures

Eye

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin

Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If discomfort continues get medical aid. Wash clothing before reuse.

Ingestion

Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation

Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

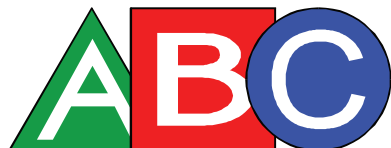
Note To Physician

Treat symptomatically and supportively.

MATERIAL SAFETY DATA SHEET

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Fire Fighting (Pictograms)



5. Fire Fighting Measures

Flash Point: NA °F NA °C

Flash Point Method: NA

Autoignition Point: NA °F NA °C

Flammability Class: NA

Lower Explosive Limit: NA

Upper Explosive Limit: NA

Fire And Explosion Hazards

Can ignite by spontaneous combustion in the presence of organics.

Extinguishing Media

Use water spray, dry chemical, carbon dioxide, or appropriate foam. Do not use organics.

Fire Fighting Instructions

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

6. Accidental Release Measures

Sweep or soak up and place in sealed container. Taking care to avoid dusting. Person protected with full face shield and proper respirator and cartridge for dust. Ventilate area and wash spill site after pick-up is complete.

7. Handling and Storage

Handling And Storage Precautions

Avoid contact with eyes, prolonged or repeated contact with skin. Avoid breathing dust. Use compatible chemical resistant gloves. Wash hands thoroughly after handling.

Handling Precautions

Wash thoroughly after handling. Use only in a well-ventilated area. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

Storage Precautions

Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.

Other Precautions

0.01 ppm high efficiency particular respirator/supplied air respirator/self-contained breathing apparatus; 0.2 ppm same as above with full face piece; 1 ppm powdered air purifying respirator with high efficiency filter/type C supplied air respirator operated in pressure demand mode. Store in a sealed container, plastic or plastic liner, in a cool, well ventilated, dry area away from volatile acids.

MATERIAL SAFETY DATA SHEET

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Protective Clothing (Pictograms)



8. Exposure Controls/Personal Protection

Engineering Controls

Ventilation: Local Exhaust: Required in handling area
Mechanical: Desirable to insure concentration of material below TLV/TWA levels
Other: Closed Ventilation System - Dust (Laboratory Fume Hood)

Eye/Face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin Protection

Wear appropriate protective gloves to prevent skin exposure.

Respiratory Protection

NIOSH approved chemical cartridge respiratory for particulates and dust or self-contained breathing apparatus with full face shield.

Other/General Protection

Lab coat/apron, flame and chemical resistant protective clothing, eye wash, safety shower, and hygiene facilities for washing.

9. Physical And Chemical Properties

Appearance

Black powder

Odor

Odorless

Chemical Type: Mixture

Physical State: Solid

Melting Point: Decomposes °C

Boiling Point: NA °C

Specific Gravity: 6.97

Molecular Weight: 133.07

Vapor Pressure: NA

Vapor Density: NA

pH Factor: NA

Solubility: Insoluble

Evaporation Rate: NA

MATERIAL SAFETY DATA SHEET

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10. Stability And Reactivity

Stability : Stable

Hazardous Polymerization: Will not occur

Conditions To Avoid (Stability)

Dust generation, excess heat, exposure to moist air or water. Mixing with organics.

Incompatible Materials

Oxidizing agents, acetone, alcohols, organics, moisture, reducing agents.

Hazardous Decomposition Products

Ruthenium Oxide

11. Toxicological Information

Chronic/Carcinogenicity

Not listed by ACGIH, IARC, NTP, or CA Prop 65.

RTECS#:

CAS# 12036-10-1: VM2654000

LD50/LC50:

CAS# 12036-10-1:

Oral, mouse: LD50 = 5570 mg/kg;

Oral, rat: LD50 = 4580 mg/kg

12. Ecological Information

No Data Available...

13. Disposal Considerations

Consult Federal EPA, State and local regulations for proper disposal/recycle/reclamation

NOTE: Chemical additions, processing, or otherwise altering this material may make the waste management information presented above incomplete, inaccurate, or otherwise inappropriate.

RCRA Information

NL

14. Transport Information

No Data Available...

MATERIAL SAFETY DATA SHEET

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15. Regulatory Information

U.S. Regulatory Information

TSCA

CAS# 12036-10-1 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 12036-10-1 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

Canadian Regulatory Information

Canada - DSL/NDSL

CAS# 12036-10-1 is listed on Canada's DSL List.

Canada - WHMIS

Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

MATERIAL SAFETY DATA SHEET

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15. Regulatory Information (cont.)

European Union (EU) Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36 Irritating to eyes.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 39 Wear eye/face protection.

16. Other Information

NFPA Rating

Health: 2

Fire: 0

Reactivity: 0

HMIS Rating

Health: 2

Fire: 0

Reactivity: 0

Personal Protection: C

Revision/Preparer Information

MSDS Preparer: DF Goldsmith Chemical and Metal

MSDS Preparer Phone Number: 847-869-7800

This MSDS Supersedes A Previous MSDS Dated: 08/21/2003

Disclaimer

In compliance with the OSHA Hazard Communication Standard, 29 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.

DF Goldsmith Chemical and Metal 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.