

Chem-Impex International Inc.

Tel: (630) 766-2112
E-mail: sales@chemimpex.com
Shipping and Correspondence:
935 Dillon Drive
Wood Dale, IL 60191 USA

Fax: (630) 766-2218
Web site: www.chemimpex.com
Manufacturing site:
825 Dillon Drive
Wood Dale, IL 60191 USA

SAFETY DATA SHEET

SECTION 1. CHEMICAL IDENTIFICATION

CATALOG #: 46542
NAME: Silver nanopowder (500~800 nm)
SYNONYMS:
24 HOUR EMERGENCY TELEPHONE: (800) 535-5053(USA)
352-323-3500 (INTERNATIONAL)
TO REQUEST AN MSDS: (800) 869-9290
CUSTOMER SERVICE: (630) 766-2112

SECTION 2. HAZARDS IDENTIFICATION

CLASSIFICATION OF THE SUBSTANCE OR MIXTURE

NOT A HAZARDOUS SUBSTANCE OR MIXTURE.

GHS LABEL ELEMENTS, INCLUDING PRECAUTIONARY STATEMENTS

NOT A HAZARDOUS SUBSTANCE OR MIXTURE.

**HAZARDS NOT
OTHERWISE
CLASSIFIED (HNOC)
OR NOT COVERED
BY GHS** NONE

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

| | |
|---------|------------------------------|
| MF: | Ag |
| MW: | 107.87 |
| CAS-NO. | 7440-22-4 |
| PURITY: | ≥ 99.9% (Trace metals basis) |

SECTION 4. FIRST-AID MEASURES

DESCRIPTION OF FIRST AID MEASURES

| | |
|--------------------------------|--|
| GENERAL ADVICE | IMMEDIATELY REMOVE ANY CLOTHING CONTAMINATED BY THE PRODUCT. MOVE OUT OF DANGEROUS AREA. CONSULT A PHYSICIAN AND SHOW THIS SAFETY DATA SHEET. |
| IF INHALED | MOVE PERSON TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN AND CONSULT A PHYSICIAN |
| IN CASE OF SKIN CONTACT | IMMEDIATELY FLUSH SKIN WITH RUNNING WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE REUSE. CONSULT A PHYSICIAN IMMEDIATELY |
| IN CASE OF EYE CONTACT | IMMEDIATELY WASH SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS. IF IRRITATION PERSISTS, CONSULT A PHYSICIAN. |
| IF SWALLOWED | DO NOT INDUCE VOMITING . NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. RINSE MOUTH WITH WATER. CONSULT A PHYSICIAN. |

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

THE MOST IMPORTANT KNOWN SYMPTOMS AND EFFECTS ARE DESCRIBED IN THE LABELLING (SEE SECTION 2) AND/OR IN SECTION 11

INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

NO DATA AVAILABLE

SECTION 5. FIRE AND EXPLOSION DATA

EXTINGUISHING MEDIA

SUITABLE EXTINGUISHING MEDIA

USE WATER SPRAY, DRY CHEMICAL, CARBON DIOXIDE OR CHEMICAL FOAM.

SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

CARBON OXIDES, NITROGEN OXIDES (NOX), SULPHUR OXIDES, POTASSIUM OXIDES

ADVICE FOR FIREFIGHTERS

WEAR SELF CONTAINED BREATHING APPARATUS FOR FIRE FIGHTING IF NECESSARY.

FURTHER INFORMATION

NO DATA AVAILABLE

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

WEAR PROTECTIVE EQUIPMENT AND KEEP UNPROTECTED PERSONNEL AWAY. ENSURE ADEQUATE VENTILATION. REMOVE ALL SOURCES OF IGNITION. PREVENT FURTHER LEAK OR SPILL IF SAFE TO DO SO.

FOR PERSONAL PROTECTION SEE SECTION 8.

ENVIRONMENTAL PRECAUTIONS

PREVENT FURTHER LEAKAGE OR SPILLAGE IF SAFE TO DO SO. DO NOT LET PRODUCT ENTER DRAINS. DISCHARGE INTO THE ENVIRONMENT MUST BE AVOIDED.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

PREVENT FURTHER LEAK OR SPILL IF SAFE TO DO SO. VACUUM, SWEEP UP, OR ABSORB WITH INERT MATERIAL AND PLACE INTO A SUITABLE DISPOSAL

CONTAINER. CONSULT LOCAL REGULATIONS FOR DISPOSAL

REFERENCE TO OTHER SECTIONS FOR DISPOSAL SEE SECTION 13.

SECTION 7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING AVOID CONTACT WITH SKIN, EYES, AND PERSONAL CLOTHING. WASH HANDS THOROUGHLY AFTER HANDLING. AVOID BREATHING FUMES. USE ONLY WITH ADEQUATE VENTILATION. WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES, AND EYE/FACE PROTECTION. KEEP AWAY FROM SOURCES OF IGNITION. MINIMIZE DUST GENERATION AND ACCUMULATION. KEEP CONTAINER TIGHTLY CLOSED. OPEN AND HANDLE CONTAINER WITH CARE. DO NOT EAT, DRINK, OR SMOKE WHILE HANDLING.

FOR PRECAUTIONS SEE SECTION 2.

CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES STORE IN A TIGHTLY-CLOSED CONTAINER WHEN NOT IN USE. STORE IN A COOL, DRY, WELLVENTILATED AREA AWAY FROM INCOMPATIBLE SUBSTANCES. KEEP AWAY FROM SOURCES OF IGNITION.

RECOMMENDED STORAGE TEMPERATURE Store at RT

SPECIFIC END USE(S) FOR LABORATORY USE ONLY

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CONTROL PARAMETERS

COMPONENTS WITH WORKPLACE CONTROL PARAMETERS CONTAINS NO SUBSTANCES WITH OCCUPATIONAL EXPOSURE LIMIT VALUES.

EXPOSURE CONTROLS

| | |
|--|--|
| APPROPRIATE ENGINEERING CONTROLS | AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. WASH HANDS BEFORE BREAKS AND IMMEDIATELY AFTER HANDLING THE PRODUCT. FACILITIES STORING OR UTILIZING THIS MATERIAL SHOULD BE EQUIPPED WITH AN EYEWASH FOUNTAIN. USE ADEQUATE VENTILATION TO KEEP AIRBORNE CONCENTRATIONS LOW. |
| PERSONAL PROTECTIVE EQUIPMENT | |
| EYE/FACE PROTECTION | SAFETY GLASSES WITH SIDE-SHIELDS CONFORMING TO EN166 USE EQUIPMENT FOR EYE PROTECTION TESTED AND APPROVED UNDER APPROPRIATE GOVERNMENT STANDARDS SUCH AS NIOSH (US) OR EN 166(EU). |
| SKIN PROTECTION | HANDLE WITH GLOVES. GLOVES MUST BE INSPECTED PRIOR TO USE. USE PROPER GLOVE REMOVAL TECHNIQUE (WITHOUT TOUCHING GLOVE'S OUTER SURFACE) TO AVOID SKIN CONTACT WITH THIS PRODUCT. DISPOSE OF CONTAMINATED GLOVES AFTER USE IN ACCORDANCE WITH APPLICABLE LAWS AND GOOD LABORATORY PRACTICES. WASH AND DRY HANDS. |
| BODY PROTECTION | IMPERVIOUS CLOTHING, THE TYPE OF PROTECTIVE EQUIPMENT MUST BE SELECTED ACCORDING TO THE CONCENTRATION AND AMOUNT OF THE DANGEROUS SUBSTANCE AT THE SPECIFIC WORKPLACE. |
| RESPIRATORY PROTECTION | WHERE RISK ASSESSMENT INDICATES AIR-PURIFYING RESPIRATORS ARE REQUIRED USE A DUST MASK TYPE N95 (US) OR TYPE P1 (EN 143) RESPIRATOR. RESPIRATORS AND COMPONENTS MUST TESTED AND APPROVED UNDER APPROPRIATE GOVERNMENT STANDARDS - NIOSH (US) OR CEN (EU). |
| CONTROL OF ENVIRONMENTAL EXPOSURE | PREVENT FURTHER LEAKAGE OR SPILLAGE IF SAFE TO DO SO. DO NOT LET PRODUCT ENTER DRAINS. DISCHARGE INTO THE ENVIRONMENT MUST BE AVOIDED. |

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

| | |
|------------------------------|-------------------|
| APPEARANCE | Black powder |
| ODOUR | NO DATA AVAILABLE |
| ODOUR THRESHOLD | NO DATA AVAILABLE |
| PH | NO DATA AVAILABLE |
| MELTING POINT/FREEZING POINT | |

| | |
|--|-------------------|
| INITIAL BOILING POINT AND BOILING RANGE | |
| FLASH POINT | |
| EVAPORATION RATE | NO DATA AVAILABLE |
| FLAMMABILITY (SOLID, GAS) | NO DATA AVAILABLE |
| UPPER/LOWER | NO DATA AVAILABLE |
| FLAMMABILITY OR EXPLOSIVE LIMITS | |
| VAPOUR PRESSURE | NO DATA AVAILABLE |
| VAPOUR DENSITY | NO DATA AVAILABLE |
| RELATIVE DENSITY | |
| WATER SOLUBILITY | NO DATA AVAILABLE |
| PARTITION COEFFICIENT: N- OCTANOL/WATER | NO DATA AVAILABLE |
| AUTO-IGNITION TEMPERATURE | NO DATA AVAILABLE |
| DECOMPOSITION TEMPERATURE | NO DATA AVAILABLE |
| VISCOSITY | NO DATA AVAILABLE |
| EXPLOSIVE PROPERTIES | NO DATA AVAILABLE |
| OXIDIZING PROPERTIES | NO DATA AVAILABLE |
| OTHER SAFETY INFORMATION | NO DATA AVAILABLE |

SECTION 10. STABILITY AND REACTIVITY

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|---|---|
| REACTIVITY | NO DATA AVAILABLE |
| CHEMICAL STABILITY | STABLE UNDER RECOMMENDED STORAGE CONDITIONS. |
| POSSIBILITY OF HAZARDOUS REACTIONS | NO DATA AVAILABLE |
| CONDITIONS TO AVOID | HEAT, FLAMES AND SPARKS |
| INCOMPATIBLE MATERIALS | STRONG OXIDIZING AGENTS |
| HAZARDOUS DECOMPOSITION PRODUCTS | CARBON MONOXIDE, NITROGEN OXIDES, HYDROGEN CHLORIDE IN THE EVENT OF FIRE: SEE SECTION 5 |

SECTION 11. TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

ACUTE TOXICITY NO DATA AVAILABLE

**SKIN
CORROSION/IRRITATION** NO DATA AVAILABLE

**SERIOUS EYE
DAMAGE/EYE IRRITATION** NO DATA AVAILABLE

**RESPIRATORY OR SKIN
SENSITISATION** NO DATA AVAILABLE

**GERM CELL
MUTAGENICITY** NO DATA AVAILABLE

CARCINOGENICITY
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.

REPRODUCTIVE TOXICITY NO DATA AVAILABLE

**SPECIFIC TARGET ORGAN
TOXICITY - SINGLE
EXPOSURE** NO DATA AVAILABLE

**SPECIFIC TARGET ORGAN
TOXICITY - REPEATED
EXPOSURE** NO DATA AVAILABLE

ASPIRATION HAZARD NO DATA AVAILABLE

**ADDITIONAL
INFORMATION** RTECS: NOT AVAILABLE
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL AND TOXICOLOGICAL PROPERTIES OF THIS SUBSTANCE HAVE NOT BEEN THOROUGHLY INVESTIGATED.

SECTION 12. ECOLOGICAL INFORMATION

| | |
|---|--|
| TOXICITY | NO DATA AVAILABLE |
| PERSISTENCE AND DEGRADABILITY | NO DATA AVAILABLE |
| BIOACCUMULATIVE POTENTIAL | NO DATA AVAILABLE |
| MOBILITY IN SOIL | NO DATA AVAILABLE |
| RESULTS OF PBT AND VPVB ASSESSMENT | PBT/VPVB ASSESSMENT NOT AVAILABLE AS CHEMICAL SAFETY ASSESSMENT NOT REQUIRED/NOT CONDUCTED |
| OTHER ADVERSE EFFECTS | NO DATA AVAILABLE |

SECTION 13. DISPOSAL CONSIDERATIONS

WASTE TREATMENT METHODS

| | |
|-------------------------------|---|
| PRODUCT | OFFER SURPLUS AND NON-RECYCLABLE CHEMICAL TO A LICENSED DISPOSAL COMPANY. CONTACT A LICENSED PROFESSIONAL WASTE DISPOSAL SERVICE TO DISPOSE OF THIS MATERIAL. |
| CONTAMINATED PACKAGING | DISPOSE OF AS UNUSED PRODUCT. |

SECTION 14. TRANSPORT INFORMATION

DOT (US)
NOT DANGEROUS GOODS

IMDG
NOT DANGEROUS GOODS

IATA
NOT DANGEROUS GOODS

SECTION 15. REGULATORY INFORMATION

| | | |
|---|---|---------------|
| 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. | |
| MASSACHUSETTS RIGHT TO KNOW COMPONENTS | NO COMPONENTS ARE SUBJECT TO THE MASSACHUSETTS RIGHT TO KNOW ACT. | |
| PENNSYLVANIA RIGHT TO KNOW COMPONENTS | CAS-NO. | REVISION DATE |
| Silver nanopowder (500~800 nm) | 7440-22-4 | |
| NEW JERSEY RIGHT TO KNOW COMPONENTS | CAS-NO. | REVISION DATE |
| Silver nanopowder (500~800 nm) | 7440-22-4 | |
| CALIFORNIA PROP. 65 COMPONENTS | THIS PRODUCT DOES NOT CONTAIN ANY CHEMICALS KNOWN TO STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS, OR ANY OTHER REPRODUCTIVE HARM. | |

SECTION 16. OTHER INFORMATION

MSDS LEGEND

| | |
|--------|--|
| MW: | MOLECULAR WEIGHT |
| MF: | MOLECULAR FORMULA |
| VOC: | VOLATILE ORGANIC COMPOUNDS |
| ACGIH: | AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGINISTS |
| CAS: | CHEMICAL ABSTRACTS SERIVE REGISTRY NUMBER |
| OSHA: | OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION |
| PEL: | PERMISSIBLE EXPOSURE LIMIT (OSHA) |
| TLV: | THRESHOLD LIMIT VALUE (ACGIH) |

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