

Material Safety Data Sheet

acc. to OSHA and ANSI

- **1 Identification of substance:**

- **Product details:**

- **Product name:** Vanadium (II) oxide

- **Stock number:** 5495YD

- **Manufacturer/Supplier:**

Nanostructured & Amorphous Materials, Inc.
16840 Clay Road, Suite #113
Houston, TX 77084, USA

- **2 Composition/Data on components:**

- **Chemical characterization:**

Description: (CAS#)

Vanadium (II) oxide (CAS# 12035-98-2), 100%

- **3 Hazards identification**

- **Hazard description:** T Toxic

- **Information pertaining to particular dangers for man and environment**

R 21/22 Harmful in contact with skin and if swallowed.

R 23 Toxic by inhalation.

- **Classification system**

- **HMIS ratings (scale 0-4)**

(Hazardous Materials Identification System)

Health (acute effects) = 2

Flammability = 0

Reactivity = 0

- **4 First aid measures**

- **General information**

Immediately remove any clothing soiled by the product.

Remove breathing apparatus only after contaminated clothing has been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

- **After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

- **After skin contact**

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

- **After eye contact**

Rinse opened eye for several minutes under running water. Then consult a doctor.

- **After swallowing** Seek immediate medical advice.

- **5 Fire fighting measures**

- **Suitable extinguishing agents**

CO₂, sand, extinguishing powder. Do not use water.

- **For safety reasons unsuitable extinguishing agents** Water

- **Special hazards caused by the material, its products of combustion or resulting gases:**

Toxic metal oxide fume

- **Protective equipment:**

Wear self-contained respirator.

Wear fully protective impervious suit.

- **6 Accidental release measures**

- **Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

- **Measures for environmental protection:**

Do not allow material to be released to the environment without proper governmental permits.

- **Measures for cleaning/collecting:**

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

Do not flush with water or aqueous cleansing agents

- **Additional information:**

See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

- **7 Handling and storage**

- **Handling**

- **Information for safe handling:**

Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Open and handle container with care.

- **Information about protection against explosions and fires:**

Keep ignition sources away.

- **Storage**

- **Requirements to be met by storerooms and receptacles:**

No special requirements.

- **Information about storage in one common storage facility:** Not required.

- **Further information about storage conditions:**

Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

- **8 Exposure controls and personal protection**

- **Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Not required.

- **Additional information:** No data

- **Personal protective equipment**

- **General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Avoid contact with the eyes and skin.

- **Breathing equipment:**
Use suitable respirator when high concentrations are present.
- **Protection of hands:** Impervious gloves
- **Eye protection:** Safety glasses
- **Body protection:** Protective work clothing.

• **9 Physical and chemical properties:**

• **General Information**

- **Form:** Crystalline
- **Color:** Light grey
- **Odor:** Not determined

| | <u>Value/Range</u> | <u>Unit</u> | <u>Method</u> |
|--|--------------------|------------------------|---------------|
| • Change in condition | | | |
| • Melting point/Melting range: | | 950 ° C | |
| • Boiling point/Boiling range: | Not determined | | |
| • Sublimation temperature / start: | Not determined | | |
| • Flash point: | Not applicable | | |
| • Ignition temperature: | Not determined | | |
| • Decomposition temperature: | Not determined | | |
| • Danger of explosion: Product does not present an explosion hazard. | | | |
| • Explosion limits: | | | |
| • Lower: | Not determined | | |
| • Upper: | Not determined | | |
| • Vapor pressure: | Not determined | | |
| • Density: | at 20 ° C | 5.76 g/cm ³ | |
| • Solubility in / Miscibility with | | | |
| • Water: | Insoluble | | |

• **10 Stability and reactivity**

- **Thermal decomposition / conditions to be avoided:**
Decomposition will not occur if used and stored according to specifications.
- **Materials to be avoided:**

- **Dangerous reactions** No dangerous reactions known
- **Dangerous products of decomposition:** Toxic metal oxide fume

- **11 Toxicological information**

- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Subacute to chronic toxicity:**
Vanadium compounds act chiefly as an irritant to the eyes and respiratory tract. Exposure may cause conjunctivitis, rhinitis and reversible irritation of the respiratory tract. More severe cases may cause bronchitis, bronchospasms and asthma like disease. May cause polycythemia, red blood cell destruction and anemia, albuminuria and hematuria, gastrointestinal disorders, nervous complaints and severe cough.
- **Additional toxicological information:**
Danger through skin absorption.
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

- **12 Ecological information:**

- **General notes:**
Do not allow material to be released to the environment without proper governmental permits.

- **13 Disposal considerations**

- **Product:**
- **Recommendation**
Consult state, local or national regulations to ensure proper disposal.
- **Uncleaned packagings:**
- **Recommendation:**
Disposal must be made according to official regulations.

- **14 Transport information**

- **DOT regulations:**
- **Hazard class:** 6.1
- **Identification number:** UN3285
- **Packing group:** II
- **Proper shipping name (technical name):**
VANADIUM COMPOUND, N.O.S.
- **Label** 6.1

- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** 6.1 (T5) Toxic substances
- **Danger code (Kemler):** 60
- **UN-Number:** 3285
- **Packaging group:** II
- **Description of goods:** 3285 VANADIUM COMPOUND, N.O.S. (Vanadium (II) oxide)

- **Maritime transport IMDG:**
- **IMDG Class:** 6.1
- **UN Number:** 3285
- **Label** 6.1
- **Packaging group:** II
- **Proper shipping name:** VANADIUM COMPOUND, N.O.S.

- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** 6.1
- **UN/ID Number:** 3285
- **Label** 6.1
- **Packaging group:** II
- **Proper shipping name:** VANADIUM COMPOUND, N.O.S.

- **15 Regulations**

- **Product related hazard informations:**
- **Hazard symbols:** T Toxic

- **Risk phrases:**
21/22 Harmful in contact with skin and if swallowed.
23 Toxic by inhalation.

- **Safety phrases:**
4 Keep away from living quarters.

9 Keep container in a well-ventilated place.
20 When using do not eat or drink.
36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
43 In case of fire, use sand, carbon dioxide or powdered extinguishing agent. Never use water.
45 In case of accident or if you feel unwell, seek medical advice immediately.
60 This material and its container must be disposed of as hazardous waste.

- **National regulations**

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

- **Information about limitation of use:**

For use only by technically qualified individuals.

- **16 Other information:**

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.