

Material Safety Data Sheet
acc. to OSHA and ANSI

1 Identification of substance:

Product details:

Product name: Vanadium (IV) oxide nanopowder

Manufacturer/Supplier:

Nanostructured & Amorphous Materials, Inc.
1526 Katy Gap Road, #302
Katy, TX 77494, USA

2 Composition/Data on components:

Chemical characterization:

Description: (CAS#)

Vanadium (IV) oxide (CAS# 12036-21-4): 100%

Identification number(s):

EINECS Number: 234-841-1

3 Hazards identification

Hazard description:



T Toxic

Information pertaining to particular dangers for man and environment

R 23/25 Toxic by inhalation and if swallowed.

R 36/37/38 Irritating to eyes, respiratory system and skin.

Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH	3
FIRE	0
REACTIVITY	0

Health (acute effects) =
3 Flammability = 0
Reactivity = 0

GHS label elements



Danger

3.1/2 - Fatal if swallowed.

3.1/2 - Fatal if inhaled.

3.2/2 - Causes skin irritation.

3.3/2A - Causes serious eye irritation.

3.8/3 - May cause respiratory irritation.

Prevention:

Do not breathe dust/fume/gas/mist/vapours/spray.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection.

Response:

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. IF ON SKIN: Wash with plenty of soap and water.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Immediately call a POISON CENTER or doctor/physician.

Call a POISON CENTER or doctor/physician if you feel

unwell. Specific treatment is urgent (see label).

Specific treatment (see label).

Material Safety Data Sheet
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Product name: Vanadium (IV) oxide nanopowder

Rinse mouth.
If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
Storage:
Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal:
Dispose of contents/container in accordance with local/regional/national/international regulations.

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
Do not induce vomiting; immediately call for medical help. Seek immediate medical advice.

5 Fire fighting measures

Suitable extinguishing agents Special powder for metal fires. Do not use water.
For safety reasons unsuitable extinguishing agents
Water
Halogenated extinguisher
Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released: 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.
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: The product is not flammable
Storage
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Store away from halogens.
Further information about storage conditions:
Keep container tightly sealed.

Material Safety Data Sheet
acc. to OSHA and ANSI

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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:

Check protective gloves prior to each use for their proper condition. Impervious gloves

Material of gloves

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties:

General Information

Form:	Crystalline
Color:	Black
Odor:	Not determined

Change in condition

Melting point/Melting range:	1976°C (3589°F)
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 (68°F): 4.339 g/cm³

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: Halogens

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.

Material Safety Data Sheet
acc. to OSHA and ANSI

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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:

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 undiluted product or large quantities of it to reach ground water, water course or sewage system.

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 (IV) oxide)

Maritime transport IMDG:



IMDG Class: 6.1
UN Number: 3285
Label: 6.1
Packaging group: II

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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.

UN "Model Regulation": UN3285, VANADIUM COMPOUND, N.O.S., 6.1, II

15 Regulations

Product related hazard informations:

Hazard symbols:

T Toxic

Risk phrases:

23/25 Toxic by inhalation and if swallowed.
36/37/38 Irritating to eyes, respiratory system and skin.

Safety phrases:

4 Keep away from living quarters.
9 Keep container in a well-ventilated place.
20 When using do not eat or drink.
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36/37 Wear suitable protective clothing and gloves.
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.
This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

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.

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association"
(IATA) ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization"
(ICAO) GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)