

Material Safety Data Sheet

Vanadium(IV) oxide

Report No.: VIH241107002-1
Version: 2.1
Preparation Date: 07/11/2024
Revision Date: 07/11/2024

1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product Name	Vanadium(IV) oxide
Product No.	230802
Formula	VO ₂
CAS No.	12036-21-4
Synonyms	Vanadium Dioxide, Vanadium Oxide

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Laboratory chemicals, Scientific research
Uses advised against	Consulting manufacturers

1.3 Details of the supplier of the safety data sheet

Company Name	VI HALBLEITERMATERIAL GmbH
Street	Bergener Straße 14.,
City	Hannover
State	Niedersachsen
Zip Code	30625
Country	Germany
Tel	0049 1626484175
Email	info@vimaterial.de
Website	https://vimaterial.de/

1.4 Emergency telephone number

Emergency Phone #	0049 1626484175
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2. Hazards Identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 (CLP)

Physical hazards

Not Classified

Health hazards

Acute Toxicity (Oral)	Category 4 (H302)
Acute Toxicity (Inhalation)	Category 4 (H332)
Skin Corrosion/Irritation	Category 2 (H315)
Serious Eye Damage/Irritation	Category 2 (H319)
STOT - single exposure	Category 3 (H335)

Environmental hazards

Not Classified

Full text of Hazard Statements: see section 16

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP)

Signal Word	Warning
Pictograms	

Hazard Statements

H302+H332	Harmful if swallowed or if inhaled.
H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation

Precautionary Statements

Prevention	
P261	Avoid breathing dust/fume/gas/mist/vapors/spray
P264	Wash contaminated skin thoroughly after handling.
P280	Wear protective gloves/protective clothing.
Response	
P302 + P352	IF ON SKIN: Wash with plenty of soap and water
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P332+P313	If skin irritation occurs: Get medical advice/attention
P337+P313	If eye irritation persists: Get medical advice/attention
P362	Take off contaminated clothing and wash before reuse
Storage	
P405	Store locked up
Disposal	
P501	Dispose of contents/container in accordance with local/regional/national/international regulations

2.3 Other hazards

This product does not contain any substances classified as PBT or vPvB

This product does not contain any known or suspected endocrine disruptors.

3. Composition/information on ingredients

3.1 Substances

Chemical Family	Ceramic
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Component	CAS No.	EC No.	Concentration
Vanadium oxide (VO ₂)	12036-21-4	234-841-1	<=100%

4. First aid measures

4.1 Description of first aid measures

General Treatment	If symptoms persist, call a physician. Show this Safety Data Sheet to the medical personnel.
Inhalation	Remove victim to fresh air. If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions.
Skin	Take off immediately all contaminated clothing. Rinse skin with water/ shower. Seek medical attention.
Eyes	Rinse with pure water for at least 15 minutes. Remove contact lenses, if present and easy to do. Seek medical attention.
Ingestion	Clean mouth with water. Seek medical attention.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed

1	Based on the symptoms that appear, provide targeted treatment.
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2	Be aware that symptoms may be delayed.
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5. Firefighting Measures

5.1 Extinguishing Media

Suitable extinguishing media	Use dry chemical, carbon dioxide or alcohol-resistant foam.
Unsuitable extinguishing media	N/A

5.2 Special hazards arising from the substance or mixture

1	Vanadium/vanadium oxides
2	Non-flammable.
3	Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

1	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
2	Fight fire from a safe distance and with adequate protection.
	Do not allow firefighting water to enter drains or water courses.
3	Collect contaminated firefighting water separately.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Remove persons to safety. Use personal protective equipment as required. Avoid dust formation.
For emergency responders	Wear breathing apparatus if exposed to vapours/dust/spray/gases.

6.2 Environmental Precautions

1	Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it.
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6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill	Covering of drains, Take up mechanically.
Advice on how to clean up a spill	Sweep up and shovel. Take care not to raise dust.
Other information relating to spills and releases	Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

7. Handling and Storage

7.1 Precautions for safe handling

Recommendations	Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid ingestion and inhalation. Avoid dust formation. Do not get in eyes, on skin, or on clothing.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2 Conditions for safe storage, including any incompatibilities

Ventilation requirements	Keep containers tightly closed in a dry, cool and well-ventilated place.
Storage Class (TRGS) 510	Class 13.
Incompatible materials	See section 10.5.

7.3 Specific end use(s)

Use in laboratories.

8. Exposure Controls/Personal Protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

Biological limit values:

No biological limit value established.

Derived No Effect Level (DNEL) / Derived Minimum Effect Level (DMEL)

No information available

Predicted No-Effect Concentration (PNEC)

Exposure scenario	Organism	Environmental compartment	PNEC value
short-term (single instance)	aquatic organisms	freshwater	PNEC=7,6 µg/l
short-term (single instance)	aquatic organisms	marine water	PNEC=2,5 µg/l
short-term (single instance)	aquatic organisms	sewage treatment plant (STP)	PNEC=450 µg/l
short-term (single instance)	aquatic organisms	Fresh water sediment	PNEC=240 mg/kg
short-term (single instance)	aquatic organisms	Marine water sediment	PNEC=79 mg/kg
short-term (single instance)	terrestrial organisms	soil	PNEC=7,2 mg/kg

8.2 Exposure controls

Appropriate engineering controls

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles) (European standard - EN166) and face protection.

Skin protection

-Hand Protection

Protective gloves (The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.)

-Other protection measures

Wear appropriate protective gloves and clothing to prevent skin exposure. Wash hands thoroughly after handling.

Respiratory Protection

No protective equipment is needed under normal use conditions.

Large scale/emergency use	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced Recommended Filter type: Particulates filter
Small scale/Laboratory use	Maintain adequate ventilation.

Environmental exposure controls

Use appropriate container to avoid environmental contamination. Keep away from drains, surface and ground water.

9. Physical and Chemical Characteristics

9.1 Information on basic physical and chemical properties

Physical State	Solid. Powder
Colour	Black
Odor	Odorless
Melting Point/Range	1.967 °C
Boiling Point/Range	No data available
Flammability (liquid)	Not applicable
Flammability (solid, gas)	No data available
Explosion limits	No data available
Flash Point	No data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
pH	N/A
Viscosity	Not applicable
Water Solubility	Insoluble
Solubility in other solvents	No data available
Partition Coefficient (n-octanol/water)	No data available
Vapor Pressure	No data available
Density / Specific Gravity	4,339 g/cm ³
Vapor Density	Not applicable
Particle characteristics	No data available

9.2 Other information

Molecular formula	VO ₂
Molecular weight	82,94 g/mol
Evaporation Rate	Not applicable - Solid

10. Stability and reactivity

10.1 Reactivity

None known, based on information available

10.2 Chemical stability

Stable under normal conditions

10.3 Possibility of hazardous reactions

Hazardous Polymerization: No information available

Hazardous Reactions: No information available

10.4 Conditions to avoid

No data available.

10.5 Incompatible materials

Halogens, Alkali metals.

10.6 Hazardous decomposition products

Vanadium oxides, Metal oxide fume

In the event of fire: see section 5

11. Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity	Oral:	No data available
	Dermal:	No data available
	Inhalation:	LC50 > 5,05 mg/L (Rat) 4 h
Skin corrosion/irritation	No data available.	
Serious eye damage/irritation	No data available.	
Respiratory or skin sensitization	No data available.	
Germ cell mutagenicity	No data available.	
Carcinogenicity	No data available. 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	
Reproductive toxicity	No data available.	
STOT - single exposure	Respiratory system	
STOT - repeated exposure	No data available.	
Aspiration hazard	Not applicable. Solid	

11.2 Information on other hazards

Endocrine Disrupting Properties: Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

12. Ecological Information

12.1 Toxicity

Ecotoxicity effects	No data available.
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12.2 Persistence and degradability

Persistence	No data available.
Degradability	No data available.

12.3 Bioaccumulative potential

Bioaccumulative potential	No data available.
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12.4 Mobility in soil

Mobility in soil	No data available.
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12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	In accordance with Annex XIII of the REACH Regulation, inorganic substances do not require assessment.
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12.6 Endocrine disrupting properties

Endocrine Disruptor Information	This product does not contain any known or suspected endocrine disruptors.
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12.7 Other adverse effects

Persistent Organic Pollutant	This product does not contain any known or suspected substance
Ozone Depletion Potential	This product does not contain any known or suspected substance

13. Disposal Considerations

13.1 Waste treatment methods

Dispose of in accordance with all applicable local and national regulations. Use recovery/recycling where feasible, otherwise incineration is the recommended method of disposal. Empty containers may contain hazardous residues. Do not cut, puncture or weld on or near to the container. Labels should not be removed from containers until they have been cleaned. Contaminated containers must not be treated as household waste. Containers should be cleaned by appropriate methods and then re-used or disposed of by landfill or incineration as appropriate. Do not incinerate closed containers.

14. Transport information

IMDG

14.1. UN number	UN3285
14.2. UN Proper shipping name	Vanadium compound, n.o.s. (Vanadium (IV) oxide)
14.3. Transport hazard class(es)	6.1
14.4. Packaging group	III

ADR/RID/ADN

14.1. UN number	UN3285
14.2. UN Proper shipping name	Vanadium compound, n.o.s. (Vanadium (IV) oxide)
14.3. Transport hazard class(es)	6.1
14.4. Packaging group	III

ICAO-IATA/DGR

14.1. UN number	UN3285
14.2. UN Proper shipping name	Vanadium compound, n.o.s. (Vanadium (IV) oxide)
14.3. Transport hazard class(es)	6.1
14.4. Packaging group	III

14.5. Environmental hazards	No hazards identified
14.6. Special precautions for user	No special precautions required
14.7. Maritime transport in bulk according to IMO instruments	Not applicable, packaged goods

15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This Safety Data Sheet is prepared in accordance with Commission Regulation (EC) 1907/2006, amended by Commission Regulation (EU) 2020/878.

Authorisations/Restrictions

Regulation (EC) 1907/2006, REACH, Annex XIV list of substances subject to authorisation:	Not applicable
Regulation (EC) 1907/2006, REACH, Annex XVII restrictions on the	Not applicable

manufacture, placing on the market and use of certain dangerous substances:

Regulation (EC) 1005/2009 on substances that deplete the ozone layer: Not applicable

Regulation (EC) 850/2004 on persistent organic pollutants, amended by (EU) No 2019/1021: Not applicable

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this substance.

16. Other information

Revision information

Preparation date	07/11/2024
Revision date	07/11/2024
Revision reason	Creation.

Abbreviations and acronyms

CAS	Chemical Abstracts Service
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
RID	Regulation concerning the International Carriage of Dangerous Goods by Rail
IATA	International Air Transportation Association
IMDG	International Maritime Dangerous Goods
LC50	Lethal Concentration 50%
LD50	Lethal Dose 50%
TWA	Time Weighted Average
STOT	Specific target organ toxicity
PBT	Persistent, Bioaccumulative, Toxic
vPvB	Very Persistent, very Bioaccumulative
WEL	Workplace exposure limit

References

- [1] CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- [2] ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>
- [3] eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- [4] Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- [5] HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>

- [6] IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- [7] IPCS - The International Chemical Safety Cards (ICSC), website:
<http://www.ilo.org/dyn/icsc/showcard.home>
- [8] ERG - Emergency Response Guidebook by U.S. Department of Transportation, website:
<http://www.phmsa.dot.gov/hazmat/library/erg>

List of relevant phrases (code and full text as stated in chapter 2 and 3)

H302	Harmful if swallowed.
H332	Harmful if inhaled.
H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation

Disclaimer

The information of this safety data sheet is based on our knowledge of this product, at the time of publication. It is given in good faith. The attention of the user is drawn to the possible risks incurred by using the product for any other purpose other than that for which it was intended. This does not in any way excuse the user from knowing and applying all the regulations governing his activity. It is the sole responsibility of the user to take all precautions required in handling the product. The aim of the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products. For further information please contact info@vimaterial.de.