

Material Safety Data Sheet

acc. to OSHA and ANSI

1 Identification of substance:

- **Product details:**
- **Trade name:** Titanium (IV) oxide
(95-97 wt% anatase + 3-5 wt% rutile)
- **Stock number:** 5430MR
- **Manufacturer/Supplier:**
Nanostructured & Amorphous Materials, Inc.
16840 Clay Road, Suite #113
Houston, TX 77084, USA

2 Composition/Data on components:

- **Chemical characterization:**

<u>(CAS#)</u>	<u>Description:</u>
Titanium (IV) oxide	(CAS# 13463-67-7), 99+%
- **Identification number(s):**
- **EINECS Number:** 215-282-2

3 Hazards identification

- **Hazard description:** Xn Harmful
- **Information pertaining to particular dangers for man and environment**
R 20 Harmful by inhalation.
R 40 Limited evidence of carcinogenic effects.

4 First aid measures

- **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**
Product is not flammable. Use fire fighting measures that suit the surrounding fire.
- **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.
Prevent formation of dust.
- **Information about protection against explosions and fires:**
No special measures required.
- **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:

Titanium dioxide	
	mg/m ³
ACGIH TLV	10; A4
Belgium TWA	10
Denmark	6
France TWA	10
Germany TWA	1.5 (respirable fraction of the aerosol)
Ireland TWA	5 (respirable dust)
	10 (total inhalable dust)
Netherlands TWA	10 (inhalable)
Switzerland TWA	6
United Kingdom TWA	4 (respirable dust)
	10 (total inhalable dust)
OSHA PEL	15 (total dust)

- **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.
- **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:** Powder
- **Color:** White
- **Odor:** Odorless
- | | <u>Value/Range</u> | <u>Unit</u> | <u>Method</u> |
|--|--------------------|-------------|---------------|
|--|--------------------|-------------|---------------|
- **Change in condition**
- **Melting point/Melting range:** 1830-1850 ° C
- **Boiling point/Boiling range:** 2500-3000 ° C
- **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 3.93–3.97 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:**
Acids
Metal powders
- **Dangerous reactions** No dangerous reactions known
- **Dangerous products of decomposition:**
No dangerous decomposition products known

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.
- **Other information (about experimental toxicology):**
Tumorigenic effects have been observed on tests with laboratory animals.
Carcinogenic effects have been observed on tests with laboratory animals.
- **Additional toxicological information:**
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
IARC-3: Not classifiable as to carcinogenicity to humans.
ACGIH A4: Not classifiable as a human carcinogen:
Inadequate data on which to classify the agent in terms of it's carcinogenicity in humans and/or animals.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.

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 for proper disposal.
- **Uncleaned packagings:**
- **Recommendation:**
Disposal must be made according to official regulations.

14 Transport information

Not a hazardous material for transportation.

- **DOT regulations:**
- **Hazard class:** None
- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** None
- **Maritime transport IMDG:**
- **IMDG Class:** None
- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** None
- **Transport/Additional information:**
Not dangerous according to the above specifications.

15 Regulations

- **Product related hazard informations:**
- **Hazard symbols:** Xn Harmful
- **Risk phrases:**
20 Harmful by inhalation.
40 Limited evidence of carcinogenic effects.
- **Safety phrases:** 22 Do not breathe dust.
- **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.