

Material Safety Data Sheet

1 Identification of substance:

* **Product details:**

* **Product name:** Zirconium Carbide

* **Manufacturer/Supplier:**

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

2 Composition/Data on components:

Chemical characterization: Description:(CAS#)

Zirconium Carbide (CAS# 12070-14-3): 97%

* **Identification number(s):**

* **EINECS Number:** 235-125-1

3 Hazards identification

* **Hazard description:**

F Highly flammable

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

R 11 Highly flammable.

* **Classification system**

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

(Hazardous Materials Identification System)

Health (acute effects) = 1

Flammability = 2

Reactivity = 1

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**

In case of fire, use sand, carbon dioxide or powdered extinguishing agent. Never use water.

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

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

In case of fire, the following can be released:
Metal oxide fume

Carbon Monoxide and carbon dioxide

* **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

Keep away from ignition sources

* **Measures for environmental protection:**

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

* **Measures for cleaning/collecting:**

Ensure adequate ventilation.

Do not flush with water or aqueous cleansing agents

Keep away from ignition sources.

* **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:**

Handle under dry protective gas.

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

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

Keep ignition sources away.

Protect against electrostatic charges.

Fumes can combine with air to form an explosive mixture.

* **Storage**

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

Store in a cool location.

* **Information about storage in one common storage facility:**

Store away from air.

Store away from oxidizing agents.

* **Further information about storage conditions:**

Store under dry inert gas.

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

This product is air sensitive.

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:

Zirconium and compounds, as Zr

Mg/m³

ACGIH TLV 5;10-STEL

Austria MAK 5

Denmark TWA 5

Finland TWA 5

Hungary 5-STEL

Korea TLV 5

Poland TWA 5;10-STEL

Russia 5-STEL

OSHA PEL 5

* **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.

Avoid contact with the eyes and skin.

* **Breathing equipment:**

Use suitable respirator when high concentrations are present.

* **Protection of hands:**

Impervious gloves

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

* **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:** Powder

* **Color:** Black

* **Odor:** Odorless

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	<u>Value/Range</u>	<u>Unit</u>	<u>Method</u>
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* **Change in condition**

* **Melting point/Melting range:** 3540°C (° F)

* **Boiling point/Boiling range:** Not determined

* **Sublimation temperature / start:** Not determined

* **Flash point:** Not applicable

* **Flammability (solid, gaseous)** Highly flammable.

* **Ignition temperature:** Not determined

* **Decomposition temperature:** Not determined

* **Explosion limits:**

* **Lower:** Not determined

* **Upper:** Not determined

* **Vapor pressure:** Not determined

* **Density:** at 20 ° C 6.73 g/cm³

<p>* Solubility in / Miscibility with</p> <p>* Water: Insoluble</p>
<p>10 <u>Stability and reactivity</u></p> <p>* Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.</p> <p>* Materials to be avoided: Air Oxidizing agents</p> <p>* Dangerous reactions No dangerous reactions known</p> <p>* Dangerous products of decomposition: Metal oxide fume Carbon monoxide and carbon dioxide</p>
<p>11 <u>Toxicological information</u></p> <p>* Acute toxicity:</p> <p>* Primary irritant effect:</p> <p>* on the skin: Irritant to skin and mucous membranes.</p> <p>* on the eye: Irritating effect.</p> <p>* Sensitization: No sensitizing effects known.</p> <p>* Subacute to chronic toxicity: Inhalation of zirconium compounds may cause pulmonary granulomas.</p> <p>* Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known. ACGIH A4: Not classifiable as a human carcinogen; Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.</p>
<p>12 <u>Ecological information:</u></p> <p>* General notes: Do not allow material to be released to the environment without proper governmental permits.</p>
<p>13 <u>Disposal considerations</u></p> <p>* Product:</p> <p>* Recommendation Consult state, local or national regulations to ensure proper disposal.</p>

* **Uncleaned packagings:**

* **Recommendation:**

Disposal must be made according to official regulations.

14 Transport information

* **DOT regulations:**

* **Hazard class:** 4.1

* **Identification number:** UN3178

* **Packing group:** III

* **Proper shipping name (technical name):**
FLAMMABLE SOLID, INORGANIC, N.O.S.
(Zirconium carbide)

Label 4.1

* **Land transport ADR/RID (cross-border)**

* **ADR/RID class:** 4.1(F3)Flammable solids

* **Danger code (Kemler):** 40

* **UN-Number:** 3178

* **Description of goods:** 3178 FLAMMABLE
SOLID, INORGANIC, N.O.S (Zirconium carbide)

* **Maritime transport IMDG:**

* **IMDG Class:** 4.1

* **UN Number:** 3178

* **Label** 4.1

* **Packaging group:** III

* **Proper shipping name:** FLAMMABLE
SOLID, INORGANIC, N.O.S. (Zirconium carbide)

* **Air transport ICAO-TI and IATA-DGR:**

* **ICAO/IATA Class:** 4.1

* **UN/ID Number:** 3178

* **Label** 4.1

* **Packaging group:** III

* **Proper shipping name:** FLAMMABLE
SOLID, INORGAINC, N.O.S (Zirconium carbide)

15 Regulations

* **Product related hazard informations:**

* **Hazard symbols:**

F Highly flammable

* **Risk phrases:**

11 Highly flammable.

* **Safety phrases:**

7 Keep container tightly closed.

33 Take precautionary measures against static discharges.

43 In case of fire, use sand, carbon dioxide or powdered extinguishing agent. Never use water.

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.

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.