

## SabinanoTubes™ Material Safety Data Sheet

1 April 2019

### 1. PRODUCT AND COMPANY IDENTIFICATION

Chemical name: Multi-walled carbon nanotubes  
Formula: Carbon (multiple graphene layers rolled-up into a cylinder/tube)  
Chemical family: Carbon nanotubes  
Synonyms: CNTs (carbon nanotubes), MWCNTs (multiwalled carbon nanotubes)

#### Manufacturer/supplier:

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### 2. HAZARDS IDENTIFICATION

#### Hazard statement(s)

**H319** May cause eye irritation.

**H335** May cause respiratory irritation.

#### Precautionary statement(s)

**P233** Keep container tightly closed.

**P260** Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

**P273** Avoid release to the environment.

**P280** Wear protective glove/ protective clothing/ protective glasses/ dust mask.

**P305 + P351 + P338** If in eyes: Rinse carefully with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

#### Hazardous Materials Identification System (HMIS) Classification

Health hazard: 2

Flammability: 0

Physical hazards: 0

**Potential Health Effects:** Limited evidence of carcinogenic effect (voluntary classification due to the presence of metal ions such as iron or cobalt or nickel). May cause sensitization due to skin contact (voluntary classification due to the presence of metal ions such as iron or cobalt or nickel).

**Inhalation:** Inhalation is the most common route of exposure to airborne particles in the workspace. CNTs may be harmful if inhaled and may result to respiratory tract irritation or the formation of lung granulomas. To prevent inhalation, use approved air-tight masks.

**Skin:** May be harmful if absorbed through skin. May cause skin irritation.

**Eyes:** May cause eye irritation.

**Ingestion:** No known hazards. May be harmful if swallowed.

### 3. COMPOSITION / DATA ON COMPONENTS

Component	%
Carbon	Up to 100
Metallic impurities	Balance

\*Exposure limits based on synthetic graphite

### 4. FIRST AID MEASURES

- **After inhalation:** Remove to fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.
- **After skin contact:** Wash with water and soap and rinse thoroughly. Seek medical advice in case of skin irritation.

- **After eye contact:** Open eye widely and rinse for several minutes under running water. Then consult a doctor.
- **After swallowing:** Seek immediate medical advice.

## 5. FIRE-FIGHTING MEASURES

**Flash point:** Not applicable.

**Explosion limits:** Unknown

**Extinguisher medium:** Water, carbon dioxide, dry chemical, or foam

**Special procedures:** None

**Decomposition products:** Carbon monoxide (incomplete combustion), Carbon dioxide (complete combustion).

**Unusual hazards:** Thermal decomposition or combustion may produce dense smoke.

**Suitable extinguishing agents:** CO<sub>2</sub>, extinguishing powder or water spray. Fight larger fires with water spray.

**Special hazards caused by the material, its products of combustion or resulting gases:** In case of fire, the following can be released: carbon monoxide (CO).

**Protective equipment:** Wear air-tight mask, gloves, safety glasses and lab coat/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.

**Measures for cleaning/collecting:** Ensure adequate ventilation.

## 7. HANDLING AND STORAGE

**Handling:** Use personal protective equipment (PPE). Detailed information on handling carbon nanotubes may be found at the ASTM Standard E 2535 - 07, [www.astm.org](http://www.astm.org).

**Storage:** Store in a cool, dry place in tightly closed containers. Ensure good ventilation at the workplace. Store away from oxidizing agents. Store away from halogens. Do not store together with acids.

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Apply appropriate engineering controls. Handle in accordance with good industrial hygiene and safety practice. Wash hands thoroughly with soap before breaks and at the end of workday.

**Personal protective equipment:**

**Eye/face protection:** Safety glasses with side-shields.

**Skin protection:** Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with the product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Body protection:** Impervious clothing, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection:** Wear suitable respiratory equipment with high efficiency dust mask when directly exposed or handling the powder.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

- Form: Powder
- Colour: Black
- Odour: Odourless

- Melting point/melting range: Not determined
- Boiling point/boiling range: Not determined
- Sublimation temperature / start: Not determined
- Flash point: Not applicable
- Ignition temperature: Not determined
- Decomposition temperature (natural): Not determined
- Decomposition temperature (thermal in air): > 500 °C.
- Danger of explosion: Product does not present an explosion hazard.
- Viscosity: Not determined
- pH: Not determined
- Vapor pressure: Not determined
- Bulk density: 0.057g/cm<sup>3</sup>
- Water: Insoluble

## **10. STABILITY AND REACTIVITY**

- Stable under normal handling and storage conditions.
- Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
- Materials to be avoided: Oxidizing agents, acids halogens, interhalogens and alkali metals.
- Dangerous reactions: No dangerous reactions known.
- Dangerous products of decomposition: carbon monoxide and carbon dioxide.

## **11. TOXICOLOGICAL INFORMATION**

**Acute toxicity:** Not available

**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:** The inhalation of graphite, both natural and synthetic, has caused pneumoconiosis in exposed workers. The

pneumoconiosis found is similar to coal worker's pneumoconiosis.

**Additional toxicological information:** The acute and chronic toxicity of CNTs is not fully known. No classification data on carcinogenic properties of this material is available.

## **12. ECOLOGICAL INFORMATION**

**General notes:** This material must not be released to the environment. It is recommended that an appropriate waste removal company is used for appropriate disposal.

## **13. DISPOSAL CONSIDERATIONS**

**Product:** Dispose in accordance with applicable international and national laws and regulations. The services of a licensed professional waste disposal company to dispose CNTs is recommended. The CNTs should be dissolved or mixed with a combustible solvent and burnt in a chemical scrubber.

**Container:** Contaminated packaging should be disposed according to local or national regulations to ensure proper disposal. Keep all carbon nanotube waste, packaging, and contaminated items segregated from other waste and dispose with a licensed or approved materials removal company.

## **14. TRANSPORT INFORMATION**

This product is classified as a non-hazardous and not dangerous material for transportation. It can be transported by road, rail, air, and sea transport.

**Hazard class:** None

## **15. REGULATORY INFORMATION**

In South Africa, it is recommended that anyone working/doing research with this product or

nanomaterials in general should adhere to the Nanosciences and Nanotechnologies Code of Conduct, which is an integral part of the implementation of the National Nanotechnology Strategy. We recommend that any person handling or working with this product should apply appropriate standards such as the ASTM E2535-07(2018) Standard Guide for Handling Unbound Engineered Nanoscale Particles in Occupational Settings.

## **16. ADDITIONAL INFORMATION**

**Date of issue: 1<sup>ST</sup> April 2019 - Version: 1**

Reference:

Handling of carbon nanotubes: ASTM Standard E 2535 – 07(2018), [www.astm.org](http://www.astm.org).

### **DISCLAIMER:**

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