

SINGLE-WALL CARBON NANOTUBES (SWNT)

Material Safety Data Sheet

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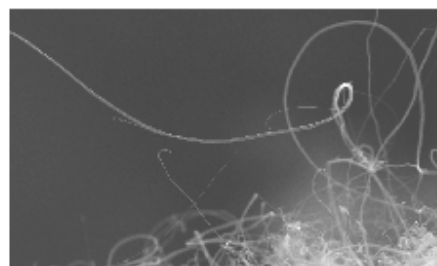
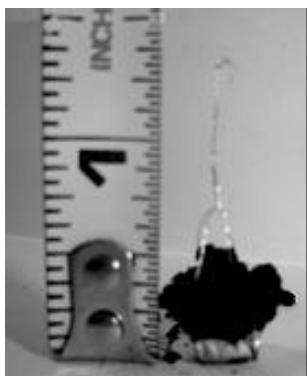
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1. Identification of Product

Trade name Single-Wall Carbon Nanotubes
Manufacturer Nanothinx S.A.

2. Product Composition and Specifications

| SWNT | | Characterization method |
|--------------------------|---|-------------------------|
| Production method | CCVD | |
| Available form | Black powder | |
| Diameter | 0.8-1.4 nm | TEM, Raman |
| Length | $\geq 5 \mu\text{m}$ | SEM, TEM |
| Bundles | 15-30 | SEM, TEM |
| Nanotubes purity | 60% < x < 65% (raw: NTX8) $\geq 85\%$ (purified: NTX9) | TGA, SEM |
| Metal particles | 40% > x > 35% (NTX8) $\leq 15\%$ (NTX9) | TGA |
| Amorphous carbon | < 1 % | TGA, Raman |
| Surface area | 500-600 m ² /g (NTX8) ~900 m ² /g (NTX9) | BET |



3. Hazards Identification

Indications of Hazards to Humans and the Environment Irritating to eyes and respiratory system.

4. First Aid Measures

After Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

After Skin Contact In case of contact, immediately wash skin with soap and copious amounts of water.

After Eye Contact In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

After Ingestion If swallowed, wash out mouth with water provided person is conscious. Call a physician.

5. Fire Fighting Measures

Suitable extinguishing agents Extinguishing powder. Do not use water.

Carbon monoxide (CO)
Special hazards caused by the material, its products of combustion or flue gases Can be released in case of fire: carbon monoxide (CO)

Protective equipment Wear self-contained breathing

6. Accidental Release Measures

Spill Procedure Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

7. Handling and Storage

Handling Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage Conditions of Storage: Keep tightly closed.

8. Exposure Control / Personal Protection

Engineering Control Safety shower and eye bath. Mechanical exhaust required.

General Hygiene Measures Wash thoroughly after handling.

Personal Protective Equipment Respiratory Protection: Government approved respirator.
Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.

Date Created: 23/03/2006 Date Revised: 20/01/2009

9. Physical and Chemical Properties

| | |
|------------------------------------|-----------------------|
| Available form | Powder |
| Color | Black |
| Odor | Odorless |
| Melting point/Melting range | Not determined |
| Boiling point/Boiling range | Not determined |
| Ignition temperature | Not determined |
| Density | 1.4 g/cm ³ |
| Water | Insoluble |

10. Stability

| | |
|------------------------------------|---|
| Stability | Thermal decomposition or combustion may produce smoke of carbon oxide and metal oxide |
| Materials to avoid | oxidizing and reducing agents, acids, halogens |
| Conditions to avoid | Avoid excessive heating |
| Dangerous reactions | No hazardous reaction when used as directed |
| Boiling point/Boiling range | Not determined |

11. Toxicological Information

| | |
|---|--|
| Primary irritant effect on the skin | Irritant for skin and mucous membranes. |
| Primary irritant effect on the eyes | Irritant effect |
| Sensitization | No sensitizing effect known. |
| Additional toxicological information | The acute and chronic toxicity of this substance is not fully determined |

12. Ecological Information

| | |
|---------------------------------------|--|
| Ecological effects information | The product is not expected to present an environmental hazard |
|---------------------------------------|--|

13. Disposal Considerations

As prepared the product is considered as non hazardous. It can then be either disposed in an approved landfill or destroyed by incineration. Volatile dust must be collected during incineration. Liquids containing significant amount of carbon nanotubes must be filtered before their released to the sewer.

14. Transport Information

Not regulated. Use precaution during transport in order to prevent accidental spill.
Not dangerous cargo. Keep separated from foodstuffs.

15. Regulatory Information

| | |
|--|--|
| Risk Phrase(s) | Irritating to eyes, respiratory system and skin. S22 Do not breathe dust |
| Security Phrase(s) | S29 Do not empty into drains S36/37/39 Wear suitable protective clothing, gloves, eye/face protection. |
| National regulations | For use only by technically qualified individuals. |
| Information about limitation of use | Employment restrictions concerning young persons must be observed. |
| Water hazard class | Generally not hazardous for water. |

16. Other Information

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