Material Safety Data Sheet
SWeNT® Thin Multi-Wall Carbon Nanotubes

SECTION 1 PRODUCT IDENTIFICATION

PRODUCT NAME: Carbon Nanotube Friable Solids

OTHER/GENERIC NAMES: SMW, SMW 100, TMWNT; TMWCNT; Specialty Multi-Wall Carbon Nanotubes, Thin Multi-Wall Carbon Nanotubes

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SECTION 2 COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient Name	CAS Number	Weight %
Thin Multi-Wall Carbon Nanotubes	None	90-100
Metallic impurities(including Molybdenum, Iron, Magnesium)	Various	1-10

Trace impurities and additional material names not listed above may also appear in Section 15 towards the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

This material is considered as hazardous under OSHA regulations.

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Product is a freeze-dried powder. May cause eye, skin and respiratory tract irritation. The complete physical and toxicological properties of this material have not been fully evaluated.

Potential Health Hazards

SKIN: This material may cause skin irritation. Use proper precautions.

EYES: This material may cause eye irritation. Use proper precautions.

INHALATION: This material may cause irritation to the mucous membranes and upper respiratory tract. The product presents an increased inhalation hazard because of the small particle size. Use proper precautions.

INGESTION: Not a probable route of exposure. This material may be harmful if swallowed.

DELAYED EFFECTS: None known.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

INGREDIENT NAME	NTP STATUS	IARC STATUS	OSHA LIST

SECTION 4 FIRST AID MEASURES

SKIN: Wash with soap and water. Get medical attention if irritation develops or persists.

EYES: Flush eyes with plenty of water. Get medical attention if irritation develops or persists.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if irritation develops or persists.

INGESTION: If person is conscious, rinse mouth with water. Do not induce vomiting unless directed to do so by a physician.

ADVICE TO PHYSICIAN: No specific advice, treat symptomatically.

SECTION 5 FIRE FIGHTING MEASURES

FLASH POINT: Not determined.
FLASH POINT METHOD: Not applicable.
AUTOIGNITION TEMPERATURE: Not determined.
UPPER FLAME LIMIT (volume % in air): Not applicable.
LOWER FLAME LIMIT (volume % in air): Not applicable.
FLAME PROPAGATION RATE (solids): Not determined.
OSHA FLAMMABILITY CLASS: Not determined.
DECOMPOSITION PRODUCTS: Carbon Monoxide, Carbon Dioxide.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Airborne dust from the dried dispersion in an enclosed space and in the presence of an ignition source may constitute an explosion hazard.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

As in any fire, wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus and full protective clothing.

SECTION 6 ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE:

Use appropriate personal protection during clean up. Remove mechanically by a method that minimizes the generation of airbourne dust (HEPA equipped vacuum, wet mopping etc.) Abosrb material and place in appropriate containers for disposal. Do not allow spilled material or wash water to enter sewers, surface water, or ground water.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

SECTION 7 HANDLING AND STORAGE

NORMAL HANDLING: (Always wear recommended personal protective equipment.)

Use local exhaust or general room/dilution ventilation sufficient to maintain exposure below permissible exposure limits (29 CFR 1910.1001 for asbestos). If possible, use in a closed well ventilated area (e.g. fume hood).

STORAGE RECOMMENDATIONS:

To maintain product quality, store between 40 and 100 °F.

SECTION 8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

ENGINEERING CONTROLS:

General room ventilation is adequate for storage and ordinary handling. Use local exhaust at points of use to maintain exposure below the PEL/TLV exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:

Impervious garments and gloves.

EYE PROTECTION:

Wear chemical goggles that conform to ANSI Z87.1 under normal conditions.

RESPIRATORY PROTECTION:

If there is potential for inhalation of dust, vapors, or aerosols wear a full-face NIOSH approved respirator with N100 cartridges or better.

The respirator must be selected based on contamination levels and use conditions found in the workplace. Use conditions must not exceed the working limits of the respirator. The respirator must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134).

ADDITIONAL RECOMMENDATIONS:

Provide safety showers and eyewash stations in close proximity to the work area.

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
Thin Multi-Wall Carbon Nanotubes	Not available.	Not available.	None.
Insoluble Molybdenum Compounds, as Mo	TWA = 10 mg/m3 (8-hr day, inhalable fraction), TWA = 3 mg/m3 (8-hr day, respirable fraction)		None.

* = Limit established by SWeNT for internal use.
** = Workplace Environmental Exposure Level (AIHA).
*** = Biological Exposure Index (ACGIH).

PEL values represent limits established by the 1989 Air Contaminants Rule (29 CFR 1910.1000, Subpart Z, Table Z-1-A) which was subsequently revoked on June 30, 1993. Several states continue to enforce Table Z-1-A limits.

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS: None.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Black powder.
PHYSICAL STATE: Solid.
ODOR: None.
SPECIFIC GRAVITY (water = 1.0): Not determined.
SOLUBILITY IN WATER (weight %): Insoluble.
pH: 4-10
BOILING POINT: Not determined.
MELTING POINT: Not applicable.
VAPOR PRESSURE: Not applicable.
VAPOR DENSITY (air = 1.0): Not determined.
EVAPORATION RATE: Not determined. COMPARED TO: Not applicable.
% VOLATILES: Not determined.
FLASH POINT: Not determined.
(Flash point method and additional flammability data are found in Section 5.)

SECTION 10 STABILITY AND REACTIVITY

STABILITY (CONDITIONS TO AVOID)
Normally stable.

INCOMPATIBILITIES:
None known.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition products may include carbon monoxide, carbon dioxide and oxides of metallic impurities (including molybdenum and cobalt).

HAZARDOUS POLYMERIZATION:
Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:
No data available.

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:
No data available.

OTHER DATA:
None.

SECTION 12 ENVIRONMENTAL INFORMATION

No data available.

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? No.
If yes, the RCRA ID number is: Not applicable.

OTHER DISPOSAL CONSIDERATIONS:
Disposal of this product is not allowed by federal, state and local government regulations. It must be destroyed by a suitable method including, but not limited to, incineration.

The information offered here is for the product as shipped. Use and/or alterations to the product, such as mixing with other materials, may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

SECTION 14 TRANSPORTATION INFORMATION

US DOT HAZARD CLASS: Not regulated.

US DOT ID NUMBER: Not applicable.
For additional information on shipping regulations affecting this material, contact the information number found on Section 1.

SECTION 15 REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: To the best of our knowledge, this material is not included in the Toxic Substances Control Act (TSCA) Inventory, and is defined as a new chemical substance which cannot be imported or manufactured for commercial purposes without complying with the Pre-Manfacturing notice (PMN) requirements codified at 40CFR Part 720. Therefore we are providing you a small quantity (as defined at 40CFR Part 730.36 (a) (1) of this product with the understanding it is to be used solely in the course of Research and Development (R&D) as defined in Section 5(h)(3) of TSCA and 40CFR Part 720.

OTHER TSCA ISSUES: None.

SARA TITLE III/CERCLA
"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)
No ingredients listed in this section.		

Spills resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center (1-800-424-8802) and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate (Acute).

The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents are found in Section 2.

INGREDIENT NAME	COMMENT
Cobalt Compounds	Elemental metal content < 0.10%.

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME	WEIGHT %	COMMENT
No ingredients listed in this section.		

ADDITIONAL REGULATORY INFORMATION

WHMIS CLASSIFICATION (CANADA):
Not determined.

FOREIGN INVENTORY STATUS:
All components of this product are listed on the following inventories:

Australian (AICS)
Canadian (DSL)
Chinese (IECSC)
European (EINECS)
Japanese (ENCS)
Korean (KECI)

SECTION 16 OTHER INFORMATION

CURRENT ISSUE DATE: July 2009
PREVIOUS ISSUE DATE: October 2008

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:
None.

OTHER INFORMATION:
None.

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