

MWCNTs N-butanol Dispersion

US Research Nanomaterials, Inc.

Material Safety Data Sheet

acc. to OSHA and ANSI

1 Identification of substance:

- **Trade name:** MWCNTs N-butanol Dispersion
- **Stock number:**
- **Manufacturer/Supplier:**
US Research Nanomaterials, Inc.
3302 Twig Leaf Lane
Houston, Texas 77084, USA
www.us-nano.com

2 Composition/Data on components:

- **Chemical characterization:**
Description: (CAS#)

MWCNTs (CAS# 99685-96-8), 3wt%
N-butanol (CAS# 71-36-3), 97wt%
- **Identification number(s):**
- **EINECS Number:** 215-609-9 (MWCNTs); 200-751-6 (N-butanol)

3 Hazards identification

- **Hazard description:** Appearance: Black liquid. Flash Point: 35 deg C. May cause central nervous system depression. May form explosive peroxides. **Flammable liquid and vapor.** Hygroscopic. Causes respiratory tract irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. This material has been reported to be susceptible to autoxidation and therefore should be classified as peroxidizable. Causes eye irritation. Breathing vapors may cause drowsiness and dizziness. Prolonged or repeated contact causes defatting of the skin with irritation, dryness, and cracking.
- **Potential Health Effects**
Eye: Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause transient corneal injury. **Skin:** May cause irritation with pain and stinging, especially if the skin is abraded. **Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause kidney damage. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea.

- **Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause narcotic effects in high concentration. Causes upper respiratory tract irritation. Inhalation of vapors may cause drowsiness and dizziness.
Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis.

- **HMIS Classification**

Health hazard: 2; Flammability: 3; Physical hazards: 0

4 First aid measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Urine acetone test may be helpful in diagnosis. Hemodialysis should be considered in severe intoxication. Treat symptomatically and supportively.

5 Fire fighting measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. May form explosive peroxides. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

Extinguishing Media: Water may be ineffective. Do NOT use straight streams of water. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. For small fires, use carbon dioxide, dry chemical, dry sand, or alcohol-resistant foam. Cool containers with flooding quantities of water until well after fire is out.

6 Accidental release measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Use water spray to dilute spill to a non-flammable mixture. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

7 Handling and storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash

before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Avoid breathing vapor or mist. Do not allow to evaporate to near dryness.

Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Do not store in direct sunlight. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. After opening, purge container with nitrogen before reclosing. Periodically test for peroxide formation on long-term storage. Addition of water or appropriate reducing materials will lessen peroxide formation. Store protected from moisture. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. All peroxidizable substances should be stored away from heat and light and be protected from ignition sources.

8 Exposure controls and personal protection

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
MWCNTs n-Butanol	(20 ppm) TWA; (50ppm) STEL	50 ppm TWA; 150 mg/m3 TWA 20 ppm IDLH (10 percent lower explosive limit)	50 ppm TWA; 150 mg/m3 TWA

OSHA Vacated PELs: n-Butanol: 50 ppm TWA; 150 mg/m3 TWA; 50 ppm STEL; 1225 mg/m3 STEL

Personal Protective Equipment

Eyes: Wear chemical goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

9 Physical and chemical properties:

Physical State: Liquid dispersion

Appearance: Black liquid

Odor: alcohol-like

pH: Not available.
Vapor Pressure: 33 mm Hg @ 20 deg C
Vapor Density: 2.1 (Air=1)
Evaporation Rate:1.7 (n-butyl acetate=1)
Viscosity: Not available.
Boiling Point: 117 deg C @ 760 mmHg
Freezing/Melting Point:-90 deg C
Ignition Temperature: 343 deg C (649 deg F)
Flash Point: 35 deg C (95 deg F)
Decomposition Temperature:Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 3; Reactivity: 0
Explosion Limits, Lower: 1.4 vol %
Upper: 11.2 vol %
Solubility: Miscible.
Specific Gravity/Density: 0.81 (water=1)
Molecular Formula: MWCNTs, C₄H₁₀O
Molecular Weight: 74.12 g/mol

10 Stability and reactivity

Chemical Stability: Stable under recommended storage conditions.

Conditions to Avoid: Light, ignition sources, excess heat, exposure to moist air or water.

Incompatibilities with Other Materials: Oxidizing agents, Alkali metals, Bases, Strong acids, Halogens

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

11 Toxicological information

Acute toxicity

Oral LD50

LD50 Oral - rat - 790 mg/kg

Remarks: Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Other changes. Blood:Other changes.

Inhalation LC50

LC50 Inhalation - rat - 4 h - 8000 ppm

Dermal LD50

LD50 Dermal - rabbit - 3,400 mg/kg

Skin corrosion/irritation

Skin - rabbit - Skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - rabbit - Eye irritation

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

12 Ecological information:

Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 1,840 mg/l - 96 h

Toxicity to daphnia EC50 - Daphnia magna (Water flea) - 1,983 mg/l - 48 h
and other aquatic
invertebrates

Persistence and degradability

Bioaccumulative potential

Bioaccumulation Oncorhynchus mykiss (rainbow trout) - 24 h
Bioconcentration factor (BCF): 0.38

13 Disposal considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

14 Transport information

	US DOT	Canada TDG
Shipping Name:	MWCNTs in N-butanol Dispersion	MWCNTs in N-butanol Dispersion
Hazard Class:	3	3
UN Number:	UN1120	UN1120
Packing Group:	III	III

15 Regulations

OSHA Hazards

Flammable liquid, Target Organ Effect, Harmful by ingestion., Irritant

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

n-Butanol	CAS-No. 71-36-3
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SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
n-Butanol	71-36-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
n-Butanol	71-36-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
n-Butanol	71-36-3	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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.