



# Super Conductor Materials, Inc.

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Chemtrec: (800) 424-9300

Poison Center: (800) 562-8236

Revision Date: January 8<sup>th</sup>, 2019

## SAFETY DATA SHEET

Identity: Lithium manganese oxide

Formula: LiMn2O4

### SECTION I - GENERAL INFORMATION

Manufacturer: Super Conductor Materials, Inc.

The information below is believed to be accurate and represents the best information available to Super Conductor Materials, Inc. However, SCM makes no warranty, expressed or implied with respect to such information and assumes no liability resulting from its use.

### SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Molecular weight: 180.81

CAS #	OSHA PEL	ACGIH TLV	%
12057-17-9	5 mg (Mn)/m3	5 mg (Mn)/m3	0.0-100.0%

### SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Physical States: powder, no odor

Boiling Point: NA

Vapor Pressure (vs. air or mmHg): NE

Melting Point: NA

Density: 3.622 g/cm<sup>3</sup>

Evaporation Rate: NA

Flash Point: N/A

Solubility in water: NE

*Appearance and odor:* powder, and pieces; no odor

### SECTION IV - FIRE AND EXPLOSION HAZARD DATA:

*Method Used:* Non-flammable

*Explosive Limits:* LEL: N/A

UEL: N/A

*Extinguishing Media:* Use suitable extinguishing agent for surrounding material and type of fire

#### *Special Fire Fighting Procedures:*

Firefighters must wear full face, self-contained breathing apparatus with full protective clothing to prevent contact with skin and eyes. Fumes from fire are hazardous. Isolate runoff to prevent environmental pollution.

#### *Unusual Fire and Explosion Hazards:*

LITHIUM OXIDE:

-If involved in a fire, lithium oxide may emit toxic fumes.

-Strong Alkali.



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- Lithium oxide readily absorbs carbon dioxide and water from the atmosphere.
- At elevated temperatures it attacks glass, silica and many metals.

### MANGANESE OXIDE:

- Violent reaction with hydrogen peroxide, calcium oxychloride and fluorine.

## SECTION V - REACTIVITY DATA

*Stability:* Stable

*Conditions to Avoid (stability):* None

*Incompatibility (Materials to avoid):* Lithium Oxide: Water, steam

Manganese Oxide: Hydrogen peroxide, calcium oxychloride and fluoride

*Hazardous Decomposition or Byproducts:* Lithium hydroxide, oxides of lithium, lithium and hydrogen gas.

*Hazardous Polymerization:* Will not occur

*Conditions to avoid (hazardous polymerization):* None

## SECTION VI - HEALTH HAZARD DATA

*Routes of entry:* Inhalation? Yes      Skin? Yes      Eyes? Yes      Ingestion? Yes      Other? No

To the best of our knowledge the chemical, physical and toxicological properties of lithium-manganese oxide have not been thoroughly investigated and recorded.

The toxicity of lithium compounds is a function of their solubility in water. Lithium ion has central nervous system toxicity. The initial effects of lithium exposure are tremors of the hands, nausea, micturition, slurred speech, sluggishness, sleepiness, vertigo, thirst, and increased urine volume. Effects from continued exposure are apathy, anorexia, fatigue, lethargy, muscular weakness, and changes in ECG. Long-term exposure leads to hypothyroidism, leukocytosis, edema, weight gain, polydipsia/polyuria (increased water intake leading to increased urinary output), memory impairment, seizures, kidney damage, shock, hypotension, cardiac arrhythmias, coma, death.

Some manganese compounds are experimental tumorigens. They can cause central nervous and pulmonary system damage by inhalation of fumes and dust. Very few poisonings have occurred from ingestion. Chronic manganese poisoning is a clearly characterized disease which results from inhalation of fumes or dusts of manganese. The central nervous system is the chief site of damage. Exposure to dusts and fumes can possibly increase the incidence of upper respiratory infections and pneumonia. (Sax, Dangerous Properties of Industrial Materials, eighth edition)

### Signs and Symptoms of Overexposure:

*Inhalation:* May cause a red, dry, burning throat, inflammation and pain throughout the respiratory tract. Metal fume fever may cause: chills, fever, muscle aches, headache, and dry throat, and sleepiness, weakness in the legs, muscular twitching, nocturnal leg cramps and slowness of speech. Manganese may cause: a slapping gait, cramps, tremors, slurred speech, hallucinations, insomnia and mental confusion. These symptoms resemble Parkinson's disease. Other symptoms of manganese include: inflammation of the kidneys, cirrhosis of the liver, anorexia, muscular fatigue, sexual impotence, reduction of the white blood cells and anemia.



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*Ingestion:* May cause burns to the esophagus, nausea, muscular twitches and mental confusion

*Skin:* May cause redness, itching, chemical burns, and blistering

*Eye:* May cause redness, itching, watering, inflammation and chemical burns.

### Health Hazards (Acute and Chronic):

#### *Inhalation:*

Acute: SEVERE IRRITANT AND CORROSIVE. Causes irritation to the respiratory tract and mucous membranes. Inhalation of manganese compounds is considered the primary route of exposure, they may cause irritation of the respiratory tract and mucous membranes. Inhalation of manganese compounds' fine dusts and fumes may cause metal fume fever.

Chronic: May cause pulmonary edema and lung damage. Chronic inhalation of manganese compounds' dust particles, approximately 3 um in size, for a period of a few months may cause pulmonary pneumonitis. Manganese compounds may also cause manganese, psychic and neurological disorders effecting the central nervous system, to develop (not fatal, but can cause permanent disability).

#### *Ingestion:*

Acute: Severe irritation and corrosive. May cause central nervous system effects, circulatory failure and cardiovascular collapse.

Chronic: May cause gastrointestinal irritation, renal dysfunction, derangement of neuromuscular activity, diabetes and kidney damage.

#### *Skin:*

Acute: Severe irritant and corrosive.

Chronic: May be an irritant and corrosive. May cause dermatitis.

#### *Eye:*

Acute: Severe irritant and corrosive.

Chronic: May cause conjunctivitis and blurred vision.

*Target Organs:* May affect the kidneys, liver, skin, eyes, respiratory, and central nervous system.

*Carcinogenicity:* NTP? No      IARC Monographs? No      OSHA Regulated? No

*Medical Conditions Aggravated by Exposure:* Pre-existing respiratory and skin disorders.

### Emergency and First Aid Procedures:

*Inhalation:* Remove victim to fresh air, keep warm and quiet, and give oxygen if breathing is difficult; seek medical attention

*Ingestion:* Give 1-2 glasses of milk or water and induce vomiting, seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person

*Skin:* Remove contaminated clothing, brush material off skin, wash affected area with mild soap and water, and seek medical attention if symptoms persist

*Eye:* Flush eyes with lukewarm water, lifting upper and lower eyelids for at least 15 minutes and seek medical attention.

<b>SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE</b>
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*Steps to be taken in case material is released or spilled:*



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Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area, provide ventilation and extinguish sources of ignition. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust.

*Waste disposal method:*

Dispose of in accordance with state, local, and federal regulations.

*Hazard Label Information:*

Store in cool, dry area and in tightly sealed container. Wash thoroughly after handling.

*Precautions:* Lithium oxide readily absorbs carbon dioxide and water from the atmosphere. Handle and store in a controlled environment and in an inert gas, such as argon.

SECTION VIII - CONTROL MEASURES
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*Protective Equipment Summary (Hazard Label Information):*

NIOSH approved respirator, impervious gloves, safety glasses, clothes to prevent contact.

*Ventilation:*

Local Exhaust: To maintain concentration at low exposure levels.

Special: Handle in a controlled atmosphere

Mechanical (General): Not recommended.

Other: Handle in an inert gas such as argon

*Work/Hygienic/Maintenance Practices:*

Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Please be advised that N/A can either mean Not Applicable or No Data Has Been Established
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