



Safety Data Sheet

1. Product and Company Identification

1.1	Product Name:	Lithium nickel manganese cobalt oxide
	Chemical Formula:	$\text{LiNi}_{0.33}\text{Mn}_{0.33}\text{Co}_{0.33}\text{O}_2$
	CAS#:	346417-97-8
1.2	Relevant identified uses of the substance or mixture and uses advised against	
	Identified uses	Laboratory chemicals, Synthesis of substances
1.3	Contact Information:	MTI Corporation 860 South 19 th Street Richmond, CA 94804, USA Tel: 510-525-3070 Fax: 510-525-4705 Email: info@mtixtl.com Website: www.mtixtl.com
1.4	Non-emergency assistance:	1-888-525-3070
	Emergency assistance:	Company: CHEMTEL (MTI Contract# MIS2559467) Day or Night Tel (Within USA and Canada): 1-800-255-3924 Tel (Outside USA and Canada): 1-813-248-0585

2. Hazards Identification

Emergency Overview: GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin sensitization (Category 1A), H317

Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

HMIS Rating

Health hazard: 2

Chronic Health Hazard: *

Flammability: 0

Physical Hazard: 0

NFPA Rating

Health hazard: 2

Fire Hazard: 0

Reactivity Hazard: 0

GHS Label elements, including precautionary statements

Pictogram	
Signal	Warning
Hazard statement(s)	
H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P272	Contaminated work clothing should not be allowed out of the workplace
P280	Wear protective gloves.
P302 + P352	IF on skin: Wash with plenty of soap and water



P308 + P313	IF exposed or concerned: Get medical advice/ attentions.
P321	Specific treatment (see supplemental first aid instructions on this label)
P333 + P313	IF skin irritation or rash occurs: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC) or not covered by GHS

None

3. Composition/Information on Ingredients

Substance Name

Synonyms

NMC

Formula

 $\text{LiNi}_{0.33}\text{Mn}_{0.33}\text{Co}_{0.33}\text{O}_2$

CAS-No.

346417-97-8

Hazardous Components

Component	Classification	Concentration
Lithium nickel manganese cobalt oxide	Skin Sens. 1; Carc. 2; H317, H351	<=100%

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. First Aid Measures

4.1 Description of first aid measures**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. Firefighting Measures

5.1 Extinguishing media**Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.2 Special hazards arising from the substance mixture

Nickel/nickel oxides, Lithium oxides, Cobalt/cobalt oxides, Manganese/manganese oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further Information

No data available



6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. Handling and Storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. Exposure Control/ Personal Protection

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control Parameters	Basis
Lithium nickel manganese cobalt oxide	346417-97-8	TWA	0.02000mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Pulmonary function Asthma Myocardial effects Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans varies		
		TWA	0.02000mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Pulmonary function Asthma Myocardial effects Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans varies		

**Biological occupational exposure limits**

Component	CAS-No.	Parameters	Value	Biological Specimen	Basis
Lithium nickel manganese cobalt oxide	346417-97-8	Cobalt	15 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		Cobalt		Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls**Appropriate engineering controls**

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment**Eye/face protection**

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

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 this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls.

If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: powder Color: black
b) Odor	No data available
c) Odor Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	No data available
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available



k) Vapor pressure	No data available
l) Vapor density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. Stability and Reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Nickel/nickel oxides, Lithium oxides, Cobalt/cobalt oxides, Manganese/manganese oxides

In the event of fire: see section 5

11. Toxicological Information

11.1 Information on toxicological effects

Acute toxicity

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitization

Germ cell mutagenicity

No data available

Carcinogenicity

Limited evidence of a carcinogenic effect.

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.

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.

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

**Reproductive toxicity**

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Large doses of lithium ion have caused dizziness and prostration, and can cause kidney damage if sodium intake is limited. Dehydration, weight loss, dermatological effects, and thyroid disturbances have been reported. Central nervous system effects that include slurred speech, blurred vision, sensory loss, ataxia, and convulsions may occur. Diarrhea, vomiting, and neuromuscular effects such as tremor, clonus, and hyperactive reflexes may occur as a result of repeated exposure to lithium ion.

12. Ecological Information

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment PBT/vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. Disposal Considerations

13.1 Waste treatment methods**Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. Transport Information

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods



15. Regulatory Information

SARA 302 Components

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

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right to Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right to Know Components

Lithium nickel manganese cobalt oxide

CAS-No.

346417-97-8

Revision Date

2007-07-01

New Jersey Right to Know Components

Lithium nickel manganese cobalt oxide

346417-97-8

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

Full text of H-Statements referred to under sections 2 and 3

Carc.	Carcinogenicity
H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
Skin Sens.	Skin sensitization.

The information above is believed to be accurate and represents the best information currently available to us. However, it does not represent any guarantee of the properties of the product. We make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we shall not be held liable for any damage resulting from handling or from contact with the above product. Users should make their own investigations to determine the suitability of the information for their particular purposes.