

## NANOGRAFI NANOTECHNOLOGY

## SECTION 1 IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

## 1.1 Product identifiers

Product Form	Substance
Trade Name	Lithium Titanium Oxide (Li <sub>4</sub> Ti <sub>5</sub> O <sub>12</sub> ) Micron Powder for Li-ion Battery Anode (LTO)
Product Number	NG08BE0306
CAS Number	12031-95-7

## 1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	Research
------------------------------	----------

## 1.3 Details of the supplier of safety data sheet

Company	Nanografi Nanotechnology
Address	ODTÜ Teknokent İvizler Binası B-1/H ODTÜ Teknokent 06531- ANKARA
Phone	+90 312 285 85 09
Fax	+90 312 210 13 09

## 1.4 Emergency Telephone Number

Emergency Telephone Number	+90 312 285 85 09
----------------------------	-------------------

## SECTION 2 HAZARDS IDENTIFICATION

## 2.1 Classification of the substance or mixture

H302	Acute Tox. 4
H315	Skin Irrit. 2
H319	Eye Irrit.2
H335	STOT SE 3

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

## NANOGRAFI NANOTECHNOLOGY

## 2.2 Label Elements

## Hazard Pictograms



## Signal Word

Warning

## Hazard Statements

H302 Harmful if swallowed.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H335 May cause respiratory irritation.

## Precautionary Statements

P201 Obtain special instructions before use.

P261 Avoid breathing dust/fume/gas/mist/vapors/spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink, or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.

P280 Wear protective gloves/protective clothing/eye protection.

P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P332 + P313 If skin irritation occurs: Get medical advice/attention.

P337 + P313 If eye irritation persists: Get medical advice/attention.

P362 Take off contaminated clothing and wash before reuse.

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P501 Dispose of contents/ container to an approved waste disposal plant.

## NANOGRAFI NANOTECHNOLOGY

## 2.3 Other Hazards

None.

## SECTION 3 COMPOSITION/INFORMATION ON INGREDIENTS

## 3.1 Substances

Synonyms	Lithium Titanate, Lithium Titanium Oxide, Tetralithium Pentatitanium Dodecaoxide, LTO
Formula	Li <sub>4</sub> Ti <sub>5</sub> O <sub>12</sub>
CAS Number	12031-95-7

## 3.2 Mixtures

Not applicable.

## SECTION 4 FIRST AID MEASURES

## 4.1 Description of first aid measures

First-aid measures after inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If required provide artificial respiration. Get medical attention.
First-aid measures after skin contact	Wash with plenty of soap and water. Wash contaminated clothing before reuse. Get medical attention if symptoms develop.
First-aid measures after eye contact	Rinse eyes under running water for at least 15 minutes. Remove contact lenses, if present and easy to do. Get medical attention if irritation persists.
First-aid measures after ingestion	Rinse mouth with water. Get medical attention.

## 4.2 Most important symptoms and effects, including acute and delayed

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

## NANOGRAFI NANOTECHNOLOGY

## 4.3 Indication of any immediate medical attention and special treatment needed

No data available.

## SECTION 5 FIREFIGHTING MEASURES

## 5.1 Extinguishing media

Suitable Extinguishing Media	Water spray
Unsuitable Extinguishing Media	Dry Chemical Powder, Carbon Dioxide.

## 5.2 Special hazards arising from the substance or mixture

Hazardous Decomposition Products	Titanium oxides. Lithium Oxides.
----------------------------------	----------------------------------

## 5.3 Advice for firefighters

In case of fire wear full-protective suit with self-contained breathing apparatus.

## SECTION 6 ACCIDENTAL RELEASE MEASURES

## 6.1 Personal precautions, protective equipment and emergency procedures

**6.1.1 For non-emergency personnel**

Protective Equipment	Wear suitable protective clothing.
Emergency Procedures	Avoid formation of dust. Avoid contact with skin, eyes and clothes. Avoid breathing dust. Ensure adequate ventilation. Evacuate area.

**6.2.2 For emergency responders**

Protective Equipment	Wear suitable protective clothing.
Emergency Procedures	Provide adequate ventilation. Evacuate area. Avoid generation of dust. Avoid breathing dust. Avoid contact with skin and eyes.

## 6.2 Environmental precautions

Do not allow material to be released to the environment without proper governmental permits.

## NANOGRAFI NANOTECHNOLOGY

Do not allow product to enter drains.

### 6.3 Methods and material for containment and cleaning up

For Containment	The material should be contained and cleaned by a method which minimizes dust generation.
Methods for cleaning up	Use mechanical cleaning equipment. Avoid generation of dust. Collect in closed containers for disposal.

### 6.4 Reference to other sections

For further information refer to section 13.

## SECTION 7 HANDLING AND STORAGE

### 7.1 Precautions for safe handling

Precautions for Safe Handling	Avoid contact with skin, eyes and clothes. Carry out operations in the open/under local exhaust/ventilation or with respiratory protection. Avoid generation of dust.
Hygiene measures	Do not eat, drink or smoke when using this product. Wash contaminated clothing before reuse.

### 7.2 Conditions for safe storage, including any incompatibilities

Storage Conditions	Store in cool, dry, and well-ventilated area. Keep container tightly closed. Ensure adequate ventilation in the work place.
Technical Measures	Storage Class (TRGS 510): Combustible Solids

### 7.3 Specific end use(s)

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

## NANOGRAFI NANOTECHNOLOGY

## SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

## 8.1 Control parameters

No data available.

## 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. Keep away from foodstuffs, beverages and feed. Remove contaminated clothing immediately.

## Hand 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.

## Eye Protection

Safety glasses with face shield conforming to EN166.

## Skin and Body Protection

Impervious clothing 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

The EPA mandates the use of full face respirators with minimum N100 grade cartridges if there is any risk of exposure to the dust. For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

## NANOGRAFI NANOTECHNOLOGY

Environmental Exposure Controls

Do not let product enter drains. Avoid release to the environment.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

## 9.1 Information on basic physical and chemical properties

Physical State	Solid
Color	White
Odor	No data available
Odor Threshold	No data available
pH	No data available
Relative Evaporation Rate	No data available
Melting Point	No data available
Freezing Point	No data available
Boiling Point	No data available
Flash Point	No data available
Auto-ignition Temperature	No data available
Decomposition Temperature	No data available
Flammability (solid, gas)	No data available
Vapor Pressure	No data available
Relative vapor density at 20°C	No data available
Relative Density	No data available
Solubility in H <sub>2</sub> O	No data available
Log Pow	No data available
Viscosity, Kinematic	No data available
Viscosity, Dynamic	No data available
Explosive Properties	No data available
Oxidizing Properties	No data available

## 9.2 Other information

No other information available.

## NANOGRAFI NANOTECHNOLOGY

## SECTION 10 STABILITY AND REACTIVITY

## 10.1 Reactivity

No data available.

## 10.2 Chemical stability

Stable at normal conditions.

## 10.3 Possibility of hazardous reactions

No data available.

## 10.4 Conditions to avoid

No data available.

## 10.5 Incompatible materials

No data available.

## 10.6 Hazardous decomposition products

Titanium Oxides, Titanium, Lithium Oxides

## SECTION 11 TOXICOLOGICAL INFORMATION

## 11.1 Information on toxicological effects

Acute Toxicity	Oral: Not classified. LD50 >2000 mg/kg Dermal: No data available. Respiratory: No data available.
Skin corrosion/irritation	Not irritating.
Serious eye damage/irritation	Not irritating.
Respiratory or Skin Sensitization	No sensitizing effect known.
Germ Cell Mutagenicity	No effects known.
Carcinogenicity	No data available.



## NANOGRAFI NANOTECHNOLOGY

Reproductive Toxicity	No effects known.
STOT-Single Exposure	Inhalation - May cause respiratory irritation.
STOT-Repeated Exposure	No data available.
Aspiration Hazard	No data available.
Other Information	RTECS: Not available.  Ingestion may cause dizziness, gastrointestinal irritation, nausea, vomiting and diarrhea, weakness, convulsions.  To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

## SECTION 12 ECOLOGICAL INFORMATION

## 12.1 Toxicity

Ecology-general	No data available.
Acute aquatic toxicity	No data available.
Chronic aquatic 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 not available as chemical safety assessment not required/not conducted.

## NANOGRAFI NANOTECHNOLOGY

## 12.6 Other adverse effects

No data available.

## SECTION 13 DISPOSAL CONSIDERATIONS

## 13.1 Waste treatment methods

Waste treatment methods

Consult official regulations to ensure proper disposal.  
Dissolve or mix the material with a combustible solvent and burn in a chem scrubber.

## SECTION 14 TRANSPORT INFORMATION

Not dangerous goods.

## SECTION 15 REGULATORY INFORMATION

## 15.1 Safety, health and environmental regulations

**SARA 313 Components**

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

**SARA 311/312 Components**

Acute Health Hazard – Lithium Titanium Oxide, CAS No. 12031-95-7

**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.

## SECTION 16 OTHER INFORMATION

## 16.1 Abbreviation of acronyms

CLP	Classification	Labelling	Packaging	Regulation;	Regulation (EC)	No
	1272/2008					

## NANOGRAFI NANOTECHNOLOGY

REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
PBT	Persistent Bioaccumulative Toxic
RTECS	The Registry of Toxic Effects of Chemical Substances
vPvB	Very Persistent and Very Bioaccumulative

## 16.2 Full text of H-statements

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
STOT SE	Specific target organ toxicity – Single exposure

## 16.3 Hazard classification

Health	2
Flammability	0
Reactivity	0

**Disclaimer**

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*