SAFETY DATA SHEET

Issuing Date No data available Revision Date 19-Nov-2014 Revision Number 1



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1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name Model LG18650HD4 Lithium Ion Rechargeable Battery

Other means of identification

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended Use LITHIUM ION BATTERIES

Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier Name LG Chem

Supplier Address LG Twin Towers,

Yeouido-dong, Yeongdeungpo-gu

Seoul 150-721 KR

Supplier Phone Number Phone:82-10-3229-2308

Contact Phone82-2-3773-3244 mignonchoi@lgchem.co.kr

Emergency telephone number

2. HAZARDS IDENTIFICATION

Classification

Supplier Email

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200) This product is an article which is a sealed battery and as such does not require an MSDS per the OSHA hazard communication standard unless ruptured. The hazards indicated are for a ruptured battery.

Skin corrosion/irritation	Category 1 Sub-category B
Serious eye damage/eye irritation	Category 1
Carcinogenicity	Category 1A
Specific target organ toxicity (repeated exposure)	Category 1

GHS Label elements, including precautionary statements



Emergency Overview

Signal word

Danger

Hazard Statements

Causes severe skin burns and eye damage May cause cancer





This product is an article which contains a chemical substance. Safety information is given for exposure to the article as sold. Intended use of the product should not result in exposure to the chemical substance This is a battery. In case of rupture: the above hazards exist.

Appearance Light pink

Physical State Solid

Odor No information available

Precautionary Statements - Prevention

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product

Precautionary Statements - Response

Immediately call a POISON CENTER or doctor/physician Specific treatment (see supplemental first aid instructions on this label)

Eves

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing Immediately call a POISON CENTER or doctor/physician

Skin

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower Wash contaminated clothing before reuse

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing Immediately call a POISON CENTER or doctor/physician

Ingestion

IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

Precautionary Statements - Storage

Store locked up

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Not applicable



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Unknown Toxicity

40% of the mixture consists of ingredient(s) of unknown toxicity

Other information

May be harmful in contact with skin Very toxic to aquatic life with long lasting effects

Interactions with Other Chemicals

Use of alcoholic beverages may enhance toxic effects.

3. COMPOSITION/INFORMATION ON INGREDIENTS

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Chemical Name	CAS No.	Weight-%	Trade Secret
Cobalt lithium manganese nickel oxide	182442-95-1	15 - 40	*
Copper	7440-50-8	3 - 7	*
Aluminum foil	7429-90-5	3 - 7	*
Phosphate(1-), hexafluoro-, lithium	21324-40-3	3 - 7	*
Ethylene carbonate	96-49-1	3 - 7	*

^{*}The exact percentage (concentration) of composition has been withheld as a trade secret

4. FIRST AID MEASURES

First aid measures

General Advice First aid is upon rupture of sealed battery.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15

minutes. Keep eye wide open while rinsing. Do not rub affected area. Remove contact lenses, if present and easy to do. Continue rinsing. Seek immediate

medical attention/advice.

Skin Contact Wash off immediately with soap and plenty of water while removing all

contaminated clothes and shoes. Seek immediate medical attention/advice.

Inhalation Remove to fresh air. If breathing has stopped, give artificial respiration. Get

medical attention immediately. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If

breathing is difficult, (trained personnel should) give oxygen. Delayed pulmonary

edema may occur. Get medical attention immediately if symptoms occur.

Ingestion Do NOT induce vomiting. Rinse mouth immediately and drink plenty of water.

Never give anything by mouth to an unconscious person. Call a physician or

poison control center immediately.

Self-protection of the first aider Ensure that medical personnel are aware of the material(s) involved, take

precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes or clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Use personal protective equipment as

required. Wear personal protective clothing (see section 8).

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Most important symptoms and effects, both acute and delayed

Most Important Symptoms and Burning sensation. **Effects**

Indication of any immediate medical attention and special treatment needed

Notes to Physician Product is a corrosive material. Use of gastric lavage or emesis is

contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure.

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5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

CAUTION: Use of water spray when fighting fire may be inefficient.

Specific Hazards Arising from the Chemical

The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products

Carbon oxides.

Explosion Data

Sensitivity to Mechanical Impact No.

Sensitivity to Static Discharge No.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.



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6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions Attention! Corrosive material. Avoid contact with skin, eyes or clothing. Ensure adequate

ventilation. Use personal protective equipment as required. Evacuate personnel to safe

areas. Keep people away from and upwind of spill/leak.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental Precautions

Environmental Precautions Refer to protective measures listed in Sections 7 and 8. Prevent further leakage or spillage

if safe to do so. Should not be released into the environment. Do not allow to enter into

soil/subsoil. Prevent product from entering drains.

Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling In case of rupture: Handle in accordance with good industrial hygiene and safety practice.

Avoid contact with skin, eyes or clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Use only with adequate ventilation and in closed systems. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash

before reuse.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from

moisture. Store locked up. Keep out of the reach of children. Store away from other

materials.

Incompatible Products Acids. Bases. Oxidizing agent.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Cobalt lithium manganese nickel oxide	TWA: 0.02 mg/m ³ Co TWA: 0.02		IDLH: 500 mg/m³ Mn
182442-95-1	mg/m³ Mn	Ceiling: 5 mg/m³ Mn	IDLH: 10 mg/m³ Ni
	TWA: 0.1 mg/m³ Mn		TWA: 1 mg/m³ Mn
			TWA: 0.015 mg/m³ except Nickel carbonyl Ni
			STEL: 3 mg/m³ Mn



Copper	TWA: 0.2 mg/m³ fume TWA: 1	TWA: 0.1 mg/m ³ fume	IDLH: 100 mg/m ³ dust, fume and
7440-50-8	mg/m³ Cu dust and mist	TWA: 0.1 mg/m³ dust and mist	mist
7 1 10 00 0	mg/m od ddet and miet	(vacated) TWA: 0.1 mg/m³ Cu	TWA: 1 mg/m ³ dust and mist
		dust, fume, mist	TWA: 0.1 mg/m³ fume
Aluminum foil	TWA: 1 mg/m ³ respirable fraction	TWA: 15 mg/m³ total dust	TWA: 10 mg/m ³ total dust
7429-90-5		TWA: 5 mg/m³ respirable fraction	TWA: 5 mg/m ³ respirable dust
		(vacated) TWA: 15 mg/m³ total	
		dust	
		(vacated) TWA: 5 mg/m ³	
		respirable fraction (vacated)	
		TWA: 5 mg/m³ Al Aluminum	
Phosphate(1-), hexafluoro-, lithium	TWA: 2.5 mg/m ³ F	TWA: 2.5 mg/m ³ F	
21324-40-3		TWA: 2.5 mg/m³ dust	
		(vacated) TWA: 2.5 mg/m ³	

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits NIOSH IDLH Immediately Dangerous to Life or Health

Other Exposure Guidelines

Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962

(11th Cir., 1992) See section 15 for national exposure control parameters

Appropriate engineering controls

Engineering Measures Showers

Eyewash stations Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/Face Protection Face protection shield.

Skin and Body Protection Wear protective gloves and protective clothing. Long sleeved clothing. Chemical resistant

apron. Impervious gloves.

Respiratory ProtectionNo protective equipment is needed under normal use conditions. If exposure limits are

exceeded or irritation is experienced, ventilation and evacuation may be required.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or

smoke when using this product. Take off contaminated clothing and wash before reuse. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product. For environmental protection, remove and wash all

contaminated protective equipment before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Physical State Solid
Appearance Light pi

AppearanceLight pinkOdorNo information availableColorNo information availableOdor ThresholdNo information available

<u>Property</u> <u>Values</u> <u>Remarks/ Method</u>

No data available None known No data available None known Melting / freezing point None known Boiling point / boiling range No data available Flash Point No data available None known **Evaporation Rate** No data available None known No data available Flammability (solid, gas) None known



Flammability Limit in Air

Upper flammability limit No data available Lower flammability limit No data available Vapor pressure No data available None known Vapor density No data available None known **Specific Gravity** No data available None known **Water Solubility** None known Solubility in other solvents No data available None known Partition coefficient: n-octanol/waterNo data available None known **Autoignition temperature** No data available None known No data available **Decomposition temperature** None known Kinematic viscosity No data available None known Dynamic viscosity No data available None known **Explosive properties** No data available

No data available

Other Information

Oxidizing Properties

Softening Point

VOC Content (%)

Particle Size

No data available

No data available

No data available

Particle Size Distribution

10. STABILITY AND REACTIVITY

Reactivity

No data available.

Chemical stability

Stable under recommended storage conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous Polymerization

Hazardous polymerization does not occur.

Conditions to avoid

Exposure to air or moisture over prolonged periods.

Incompatible materials

Acids. Bases. Oxidizing agent.

Hazardous Decomposition Products

Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information Product does not present an acute toxicity hazard based on known or supplied information.

In case of rupture:.



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Inhalation Specific test data for the substance or mixture is not available. Corrosive by inhalation.

(based on components). Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Inhaled corrosive substances can lead to a toxic edema of the lungs.

Pulmonary edema can be fatal. May cause irritation of respiratory tract.

Eye Contact Specific test data for the substance or mixture is not available. Causes burns. (based on

components). Corrosive to the eyes and may cause severe damage including blindness.

Causes serious eye damage. May cause irreversible damage to eyes.

Skin Contact Specific test data for the substance or mixture is not available. Corrosive. (based on

components). Causes burns.

Ingestion Specific test data for the substance or mixture is not available. Causes burns. (based on

components). Ingestion causes burns of the upper digestive and respiratory tracts. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause lung damage if swallowed. May be fatal if swallowed and enters airways. Ingestion may cause irritation to mucous membranes. Ingestion may cause gastrointestinal irritation, nausea,

vomiting and diarrhea.

Component Information

Information on toxicological effects

Symptoms Erythema (skin redness). Burning. May cause blindness. Coughing and/ or wheezing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.

Mutagenic Effects No information available.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Cobalt lithium manganese	A3	Group 1	Known	X
nickel oxide		Group 2B		
182442-95-1				

ACGIH (American Conference of Governmental Industrial Hygienists)

A3 - Animal Carcinogen

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

NTP (National Toxicology Program)

Known - Known Carcinogen

OSHA (Occupational Safety and Health Administration of the US Department of Labor)

X - Present

Reproductive Toxicity

No information available.

STOT - single exposure

No information available.



STOT - repeated exposure Causes damage to organs through prolonged or repeated exposure. Based on

classification criteria from the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200), this product has been determined to cause systemic target organ toxicity from

chronic or repeated exposure. (STOT RE).

Chronic Toxicity Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw

necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Contains a known or suspected carcinogen. Avoid repeated exposure. Prolonged exposure may cause chronic effects. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse

liver effects.

Target Organ Effects Respiratory system. Eyes. Skin. Gastrointestinal tract (GI). Blood. Central Nervous System

(CNS). Central Vascular System (CVS). Kidney. Liver. Lungs. Nasal cavities.

Aspiration Hazard No information available.

Numerical measures of toxicity Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral) 5,778.00 mg/kg ATEmix (dermal) 3,600.00 mg/kg (ATE) ATEmix (inhalation-dust/mist) 1,680.00 mg/l

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic life with long lasting effects.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Copper	96h EC50: 0.031 - 0.054	96h LC50: 0.0068 - 0.0156		48h EC50: = 0.03 mg/L
7440-50-8	mg/L (Pseudokirchneriella	mg/L (Pimephales promelas)		
	subcapitata) 72h EC50:	96h LC50: = 0.112 mg/L		
	0.0426 - 0.0535 mg/L	(Poecilia reticulata) 96h		
	(Pseudokirchneriella	LC50: = 0.3 mg/L (Cyprinus		
	subcapitata)	carpio) 96h LC50: = 0.8		
	, ,	mg/L (Cyprinus carpio) 96h		
		LC50: = 1.25 mg/L (Lepomis		
		macrochirus) 96h LC50: =		
		0.052 mg/L (Oncorhynchus		
		mykiss) 96h LC50: = 0.2		
		mg/L (Pimephales promelas)		
		96h LC50: < 0.3 mg/L		
		(Pimephales promelas)		

Persistence and Degradability

No information available.

Bioaccumulation

No information available

Other adverse effects

No information available.



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13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal methods

This material, as supplied, is not a hazardous waste according to Federal regulations (40)

CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local

regulations for additional requirements.

Contaminated Packaging Dispose of contents/containers in accordance with local regulations.

California Hazardous Waste Codes 141

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste
Cobalt lithium manganese nickel oxide 182442-95-1	Toxic
Copper 7440-50-8	Toxic
Aluminum foil 7429-90-5	Ignitable powder

14. TRANSPORT INFORMATION

Note:

The transportation of primary lithium cells and batteries is regulated by the International Civil Aviation Organization, International Air Transport Association, International Maritime Dangerous Goods Code and the US Department of Transportation. The batteries must meet the following criteria for shipment: 1. Air shipments must meet the requirements listed in Special Provision A45 of the International Air Transport Association Dangerous Goods Regulations. 2. Meet the requirements for the US Department of Transportation listed in 49 CFR 173.185. 3. The transport of primary lithium batteries is prohibited aboard passenger aircraft. Refer to the Federal Register December 15, 2004 (Hazardous Materials; Prohibited on the Transportation of Primary Lithium Batteries and Cells Aboard Passenger Aircraft; Final Rule)

Lithium batteries shipped as "Lithium batteries", "Lithium batteries packed with equipment", or "Lithium batteries contained in equipment" may not be classified as "Dangerous Goods" when shipped in accordance with "special provision A45 of IATA-DGR" or "special provision 188 of IMO-IMDG Code"

 DOT
 NOT REGULATED

 Proper Shipping Name
 NON REGULATED

Hazard Class N/A

TDG Not regulated

MEX Not regulated

ICAO Not regulated

IATA Not regulated NON REGULATED

Hazard Class N/A

IMDG/IMO Not regulated



Hazard Class N/A EmS-No. F-A, S-I

RID Not regulated

ADN Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA Complies

DSL All components are listed either on the DSL or NDSL.

Not regulated

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

US Federal Regulations

SARA 313

ADR

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Cobalt lithium manganese nickel oxide - 182442-95-1	182442-95-1	15 - 40	1.0 0.1
Copper - 7440-50-8	7440-50-8	3 - 7	1.0
Aluminum foil - 7429-90-5	7429-90-5	3 - 7	1.0

SARA 311/312 Hazard Categories

Acute Health HazardNoChronic Health HazardNoFire HazardNoSudden release of pressure hazardNoReactive HazardNo

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Cobalt lithium manganese nickel oxide 182442-95-1		Х		
Copper 7440-50-8		X	X	

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Copper 7440-50-8	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ
Aluminum foil 7429-90-5			

US State Regulations



California Proposition 65

This product contains the following Proposition 65 chemicals.

Chemical Name	California Proposition 65	
Cobalt lithium manganese nickel oxide - 182442-95-1	Carcinogen	

U.S. State Right-to-Know Regulations

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Chemical Name	New Jersey	Massachusetts	Pennsylvania	Rhode Island	Illinois
Cobalt lithium manganese nickel oxide 182442-95-1			Х	Х	X
Carbon 7440-44-0			Х		
Copper 7440-50-8	Х	Х	X	Х	Х
Aluminum foil 7429-90-5		Х		Х	
Ethylene carbonate 96-49-1		X	Х		
Dimethyl carbonate 616-38-6	Х	X	Х		

International Regulations

Mexico

National occupational exposure limits

Component	Carcinogen Status	Exposure Limits
Cobalt lithium manganese nickel oxide 182442-95-1 (15 - 40)		Mexico: TWA 0.2 mg/m ³
Copper 7440-50-8 (3 - 7)		Mexico: TWA= 1 mg/m³ Mexico: TWA= 0.2 mg/m³ Mexico: STEL= 2 mg/m³
Aluminum foil 7429-90-5 (3 - 7)		Mexico: TWA 10 mg/m ³

Mexico - Occupational Exposure Limits - Carcinogens

Canada

WHMIS Hazard Class

Non-controlled

16. OTHER INFORMATION

NFPA Health Hazards 1 Flammability 0 Instability 0 Physical and Chemical Hazards - HMIS Health Hazards 0 Flammability 0 Physical Hazard 0 Personal Protection

Prepared By Product Stewardship

23 British American Blvd. Latham, NY 12110 1-800-572-6501

Revision Date 19-Nov-2014

Revision Note No information available



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Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet





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