

MATERIAL SAFETY DATA SHEET

ICR18650 Lithium-Ion Battery

LG CHEMICAL LIMITED

1. Chemical Product and Company Identification

Product Identification

INR18650 MH1 (3200mAh, 3.7V) Lithium-Ion Battery.

Manufacturer

LG Chemical Limited

Twin Tower

Youido-Dong, Youngdeungpo-Ku

Seoul, Korea

Emergency Telephone Number

82-2-3773-7256

2. Composition Information

| Hazardous Ingredients | % | CAS Number |
|---|-----------|------------|
| Aluminum Foil | 2-10 | 7429-90-5 |
| Nickel compound (proprietary) | 0-80 | |
| Manganese compound (proprietary) | 0-15 | |
| Cobalt compound (proprietary) | 0-15 | |
| Styrene-Butadiene-Rubber | <1 | |
| Polyvinylidene Fluoride (PVDF) | <5 | 24937-79-9 |
| Copper Foil | 2-10 | 7440-50-8 |
| Carbon (proprietary) | 10-30 | 7440-44-0 |
| Electrolyte (proprietary) | 10-20 | |
| Stainless steel, Nickel and inert materials | Remainder | N/A |

3. Hazards Identification

Primary routes of entry

| | | |
|-----------------|---|----|
| Skin contact | : | NO |
| Skin absorption | : | NO |
| Eye contact | : | NO |
| Inhalation | : | NO |
| Ingestion | : | NO |

Symptoms of exposure

Emergency Overview

May explode in a fire, which could release hydrogen fluoride gas.
Use extinguishing media suitable for materials burning in fire.

Skin contact

No effect under routine handling and use.

Skin absorption

No effect under routine handling and use.

Eye contact

No effect under routine handling and use.

Inhalation

No effect under routine handling and use.

Reported as carcinogen

Not applicable

4. First Aid Measures

Inhalation

Not a health hazard.

Eye contact

Not a health hazard.

Skin contact

Not a health hazard.

Ingestion

If swallowed, obtain medical attention immediately.

IF EXPOSURE TO INTERNAL MATERIALS WITHIN CELL DUE TO DAMAGED OUTER CASING, THE FOLLOWING ACTIONS ARE RECOMMENDED ;

Inhalation

Leave area immediately and seek medical attention.

Eye contact

Rinse eyes with water for 15 minutes and seek medical attention.

Skin contact

Wash area thoroughly with soap and water and seek medical attention.

Ingestion

Drink milk/water and induce vomiting; seek medical attention.

5. Fire Fighting Measures

General Hazard

Cell is not flammable but internal organic material will burn if the cell is incinerated. Combustion products include, but are not limited to hydrogen fluoride, carbon monoxide and carbon dioxide.

Extinguishing Media

Use extinguishing media suitable for the materials that are burning.

Special Firefighting Instructions

If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) may explode/vent.

Firefighting Equipment

Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear.

6. Accidental Release Measures

On Land

Place material into suitable containers and call local fire/police department.

In Water

If possible, remove from water and call local fire/police department.

7. Handling and Storage

Handling

No special protective clothing required for handling individual cells.

Storage

Store in a cool, dry place.

8. Exposure Controls / Personal Protection

Engineering controls

Keep away from heat and open flame. Store in a cool dry place.

Personal Protection

Respirator

Not required during normal operations. SCBA required in the event of a fire.

Eye/face protection

Not required beyond safety practices of employer.

Gloves

Not required for handling of cells.

Foot protection

Steel toed shoes recommended for large container handling.

9. Physical and Chemical Properties

| | |
|---------------------|-----------|
| State | Solid |
| Odor | N/A |
| PH | N/A |
| Vapor pressure | N/A |
| Vapor density | N/A |
| Boiling point | N/A |
| Solubility in water | Insoluble |
| Specific gravity | N/A |
| Density | N/A |

10. Stability and Reactivity

Reactivity

None

Incompatibilities

None during normal operation. Avoid exposure to heat, open flame, and corrosives.

Hazardous Decomposition Products

None during normal operating conditions. If cells are opened, hydrogen fluoride and carbon monoxide may be released.

Conditions To Avoid

Avoid exposure to heat and open flame. Do not puncture, crush or incinerate.

11. Toxicological Information

This product does not elicit toxicological properties during routine handling and use.

| Sensitization | Teratogenicity | Reproductive toxicity | Acute toxicity |
|---------------|----------------|-----------------------|----------------|
| NO | NO | NO | NO |

If the cells are opened through misuse or damage, discard immediately. Internal components of cell are irritants and sensitizers.

12. Ecological Information

Some materials within the cell are bioaccumulative. Under normal conditions, these materials are contained and pose no risk to persons or the surrounding environment.

13. Disposal Considerations

California regulated debris

RCRA Waste Code : Nonregulated

Dispose of according to all federal, state, and local regulations.

14. Transport Information

Lithium Ion batteries are considered to be "Rechargeable batteries" and meet the requirements of transportation by the U.S. Department of Transportation(DOT), the International Civil Aviation Administration(ICAO), the International Maritime Dangerous Goods (IMDG) Code.

Even classified as lithium ion batteries (UN3480), 2015 IATA Dangerous Goods Regulations 56th edition Packing Instruction 965 Section IB or II is applied.

The general and additional requirements apply to all lithium ion cells and batteries prepared for transport according to this packing instruction:

1) Section IB applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section IB, Table 965-IB; and

2) Section II applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities not exceeding the allowance permitted in Section II, Table 965-II.

TABLE 965-II

| Contents | Lithium ion cells and/or batteries with a Watt-hour rating of 2.7 Wh or less | Lithium ion cells with a Watt-hour rating of more than 2.7 Wh but not more than 20 Wh | Lithium ion batteries with a Watt-hour rating of more than 2.7 Wh but not more than 100 Wh |
|---|--|---|--|
| 1 | 2 | 3 | 4 |
| Maximum number of cells/batteries per package | No limit | 8 cells | 2 Batteries |
| Maximum net quantity per package | 2.5 kg | N/A | N/A |

Cells and/or batteries specified in columns 2, 3 and 4 of Table 965-II must not be combined in the same package.

Each cell or battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria Part 3 subsection 38.3.

The product has been evaluated according to the UN Manual of Tests and Criteria.

| No. | Test Item | Criteria | Result |
|--------|------------------------|--|--------|
| Test 1 | Altitude simulation | -No leakage, venting, disassembly, rupture and no fire. -Measuring mass before/after each test. (If M>5g, less than 0.1%) -Measuring voltage before/after each test. (more than 90%) | Pass |
| Test 2 | Thermal test | | Pass |
| Test 3 | Vibration | | Pass |
| Test 4 | Shock | | Pass |
| Test 5 | External short circuit | -No disassembly, rupture and fire within six hours of this test. | Pass |
| Test 6 | Impact | -Max. temperature should not exceed 170°C. | Pass |
| Test 7 | Overcharge | -No disassembly and fire within seven days of the test. | Pass |

15. Regulatory Information

OSHA hazard communication standard (29 CFR 1910.1200)

_____Hazardous

_____✓_____Non-hazardous