MATERIAL SAFETY DATA SHEET

Product Name	Power Battery
Product Identification;	
Product Name	Power Battery
Company of Producing	BYD

1. Composition/Information on Ingredients (R12150 A-S)

Composition	Wt%
Lithium iron phosphate	20.98-21.83
PVDF	0.84-0.87
Conductor	0.63-0.65
Carbon	12.38-12.89
PTFE2	0.50-0.52
HB-9	0.25-0.26
Electrolyte(EC/EMC/DEC/1molLiPF6)	20.77-21.80
PP	1.70-1.71
Aluminum	3.88-4.04
Copper	9.56-9.95
Lithium iron phosphate	20.98-21.83

2. Hazard Identification

Material	Emergency Overview (Appearance)	Toxicity (Potential Health Effects)
Lithium iron phosphate	Blue-Black Powder (odorless)	No cases of carbon being harmful to humans have been reported.
Carbon	Black Powder (odorless)	No cases of carbon being harmful to humans have been reported. WHO and ILO have never verified that carbon irritation of the skin and mucous membrane, etc. In some individuals.
Bond	Odorless White Powder	Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material .As a finished

		product ,it is a synthetic, high molecular weight polymer . due to its chemical and physical properties , this material dos not require special handing other than the good industrial hygiene and safety practical employed with any industrial material of this type . Under normal processing conditions , this material release fame or vapor components of these release may vary with processing time and temperatures . These process releases may produce eye , skin and/or respiratory tract irritation and , with repeated or prolonged exposures .,nausea , drowsiness , headache and weakness Although unlikely under normal handling conditions , if this material is heated in excess of 600F(315C) hazardous , decomposition products will be produced . hazardous decomposition products include hydrogen fluoride and oxides of carbon , the concentrations of which vary with temperature and heating regimens
	CAUTION! MELT PROCESSING RELEASES VAPORS WHICH MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION.	
Electrolyte	Colorless Liquid	May cause moderate to severe irritation, burring , and dryness of the skin. May cause eye irritation or burning .Breathing of the

WARNING!
FLAMMABLE.
REACTS WITH WSTER TO FORM HYDROFLUORIC ACID.
MAY CAUSE BURNS TO SKIN AND EYES
EFFECTS MAY BE DELEYED. MAY CAUSE BLINDNESS.
PROBABLE REPRODUCTIVE HAZARD.

mists, vapors or fumes may irritate the nose, throat and lungs or fumes may irritate the nose throat and lungs Exposure of material with areas which contain water may generate hydrofluoric acid which can cause immediate burns on skin, severe eye bums burns to the mouth and gastrointestinal tract if ingested, and laryngeal edema if inhaled. Direct exposure to areas of the body need to be treated immediately to prevent injury.

4. First Aid Measures

Eyes: Flush with water for at least 15 minutes. If irritation occurs and persists, contact a medical doctor.

Skin: Remove contaminated clothing and thoroughly wash with soap and plenty of water. If irritation persists, contact a medical doctor.

Inhalation: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, see a medical doctor. If breathing has stopped, give artificial respiration and see a medical doctor IMMEDIATELY.

5. Fire Fighting Measures

Hazardous Combustion Products: When burned, hazardous products of combustion including fumes of carbon monoxide, carbon dioxide, and fluorine can occur

Extinguishing Media: Water, carbon dioxide, dry chemical, or foam.

Basic Fire Fighting Procedures: Wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Unusual Fire & Explosion Hazards: This material does not represent an unusual fire or explosion hazard.

Autolgnition Temperature: No Data.

Flammability Limits in Air, Lower, % by Volume: 1.4

Flammability Limits in Air, Upper, % by Volume: 11

6. Accidental Release Measures

Procedure for Release and Spill:

Sweep up and place in a suitable container, Dispose or waste according to all local,

state and Federal Laws and Regulations.

Before cleanup measures begin, review the entire MSDS with particular attention Potential Health Effects; and on Recommended Personal Protective Equipment.

7. Handling and storage

Material things Handling: Avoid contact with eyes, skin or clothing, use with adequate ventilation. Wear safety glasses and rubber gloves. Wash thoroughly after handling.

Material	Storage
Lithium iron phosphate	Keep away from strong acids. Keep container closed.
Carbon	Store this material in a sealed enclosure to avoid dispersion of carbon fiber dust. Keep container closed.
Bond	Store in a cool, dry place. This material is not hazardous under normal storage condition; however, material should be stored in closed container, in a secure area to prevent container damage and subsequent spillage.
Electrolyte	Store in tightly closed containers in a cool, dry, isolated, well-ventilated area away from heat, sources of ignition and in compatibles. Store in original container. Keep from freezing. Avoid exposure to high temperatures

Cell Handling

Technical measures

Prevention of user exposure : Not necessary under normal use.

Prevention of fire and explosion : Not necessary under normal use.

Precaution for safe handling : Do not damage or remove the external tube. Specific safe handling advice : Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water and seawater. Do not expose to strong oxdizers. Do not give a strong mechanical shock or throw down. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material. In the case of charging, use only dedicated charger or charge according to the conditions specified by BYD.

Cell Storage

Technical measures

Storage conditions (suitable, to be avoid) : Avoid direct sunlight, high temperature, high humidity. Store in cool place (temperature : -20 ~ 35 degree C, humidity : 45~85%).

8. Exposure Controls/Person Protection.

Engineering controls: Investigate engineering techniques to reduce exposures use with adequate ventilation a Recommended personal protective

Equipment

Eye/Face protection: Use good industrial practice to avoid eye contact. Processing of this product releases vapors or fumes which may cause eye irritation. Where eye contact may be likely wear chemical goggles and have eye flushing equipment available

Skin protection: Minimize skin contamination by following good industrial hygiene practices Wearing protective gloves is recommended Wash hands and contaminated skin thoroughly after handling.

Respiratory protection: Avoid breathing dust and processing vapors When adequate ventilation is not available wear a NIOSH/MSHA respirator approved for protection against inorganic dusts.

Special clothing: Robber gloves.

Other: Quick-drench eye wash and safety shower.

9. Physical and Chemical Properties

Material	Appearance	Odor	Molecular Weight	Vapor Pressure
LiFePO4	Solid, Blue-Black Powder	Odorless	157.79	_
Carbon	Black Powder	Odorless	12.01	_
PTFE2	Latex	Odorless	_	_
PVDF	Powder	Odorless	_	_
Copper	Metal	Odorless	63.55	_
Aluminum	Metal	Odorless	26.98	_
Electrolyte (EC/DEC/EMC/1molLiPF6)	Colorless Liquid, with a mild Volatile	organic odor	_	_

Material	Sublimating Point	Freezing Point/ Melting Point	Solubility in water	Density (Specific Gravity)
LiFePO4	_	>1000 deg.C (1280 deg.F)	Insoluble	_
Carbon	3000℃ or more	_	Insoluble	2.2 g/ml
PTFE2	_	_	Soluble	_

PVDF	_	165-172℃	Negligible	1.76-1.80 g/ml
Copper	_	1083℃	Insoluble	8.96 g/ml
Aluminum	_	660℃	Insoluble	2.7 g/ml
Electrolyte (EC/EMC/DEC/1molLiPF6)	126℃	_	Partial	1.22 (20/20℃) WATER=1

10. Stability and Reactivity

Material	Stability	Incompatibility	Hazardous Polymerization	Hazardous Decomposition Products
LiFePO4	Stable	Neuter	Dose not polymerize	None
Carbon	Stable	Strong oxidants	_	_
Bond	Stable	Strong base, ester	Dose not occur HF	possible oxides of carbon
Electrolyte	Volatile	Strong reducers bases, strong acids	Volatile pentafluoride compounds Hydrogen fluoride, carbon monoxide oxidizing agents, Carbon dioxide and other moist air or water. decomposition product, etc.	

☐Cell Stability : Stable under normal use

☐ Hazardous reactions occurring under specific conditions

☐ Conditions to avoid : When a battery cell is exposed to an external short-circuit, crushes, modification, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.

☐ Materials to avoid : Conductive materials, water, seawater, strong oxidizers and strong acids.

☐ Hazardous decomposition products : Acrid or harmful gas is emitted during fire.

11. Ecological Information

Eco Toxicological Information: No information available.

Chemical Fate Information: No data are available.

Environmental Effects: No data are available.

Toxicological Information

There is no data available on the product itself. The information of the internal cell materials is as follows.

Lithium iron phosphate – LiFePO4

☐ Acute toxicity : Unknown.

☐ Local effects : Unknown.

☐ Sensitization : The nervous system of respiratory organs may be stimulated sensitively.
☐ Chronic toxicity/Long term toxicity : By the inhalation of coarse particulate and steamy gas of cobalt, it is possible to cause the serious respiratory-organs disease. The person of allergy-natured or sensitive-natured may cause a skin reactionary lung disease.
☐ Local effects(skin) : Although it is very rare, the rash of the skin and allergic erythema may result. Graphite
☐ Acute toxicity : Unknown.
☐ Local effects : Unknown.
☐ Chronic toxicity/Long term toxicity : Since the prolonged inhalation under the high concentration of a graphite coarse particulate may become a cause of a lung disease or a tracheal disease, it is regulated by the coarse particulate obstacle prevention rule and the dust-lung method enforcement regulations.
☐ Carcinogen city : Graphite is not recognized as a cause of cancer by research organizations and natural toxic substance research organizations of cancer.
Copper foil
☐ Acute toxicity : Coarse particulate stimulates a nose and a tracheal. LD50, oral-sheep 18,000-182,000mg/kg 60-100mg of coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.
☐ Local effects : Unknown. Organic Electrolyte
☐ Acute toxicity : LD50, oral-rat 2,000mg/kg or more
☐ Local effects : Unknown.☐ Skin irritation study : Rabbit – Mild
☐ eye irritation study : Rabbit - Very severe

12. Disposal Information

Ensure disposal of material in compliance with all local. State and Federal-Laws and Regulations.

13. Transport Information

In the case of transportation, confirm no leakage and no overspill from a container. Take in a cargo of them without falling, dropping and breakage. Prevent collapse of cargo piles and wet by rain. The container must be handled carefully. Do not give shocks that result in a mark of hitting on a cell. Please refer to Section 7-HANDLING AND STORAGE also.

☐ Codes and classifications according to international regulations for transport

Air

IATA-DGR : special provision A45

☐ The UN classification number : Class 9 3090

However, since it corresponds to special provision A45 of IATA-DGR, this battery cell can be conveyed normally.

This Battery Had Passed UN38.3

14. TRANSPORTATION/SHIPPING INFORMATION

US DOT, All HYB batteries are not subject to the requirements of the Department of Transportation (DOT) subchapter C, Hazardous Material Regulations since each HYB battery meets the exceptions under 173.185 (b). The HYB batteries are exempted from the US DOT regulations as long as they are separated to prevent short circuits and packed in strong packing for conditions normally encountered in transportation.

ICAO and IATA, all HYB batteries are regulated as Hazardous Material by the International Civil Aviation Organization (ICAO) an the International Air Transport Association (IATA) when transporting more than 24 batteries or 12 batteries in a single package. They must be transported according to the requirement as per 50th edition of the IATA Dangerous goods Regulations (2009).

IMO, all HYB batteries are regulated as Hazardous Material by the International Maritime Organization (IMO) when transporting more than 24 batteries or 12 batteries in a single package. These must be transported according to the requirement in 50th edition of the IATA Dangerous goods Regulations (Year 2009).

ADR, RID, all HYB batteries are regulated as Hazardous Material by the ADR (road) and RID (rail) when transporting more than 24 batteries or 12 batteries in a single package. These must be transported according to the requirement in 50th edition of the IATA Dangerous goods Regulations (2009).

BUILDING OF NEW BATTERY PACK- if you build any of HYB lithium batteries into battery pack, you must assure that they are being tested in accordance
with the UN Model Regulation, Manual of Test and Criteria, Part III, subsection 38.3.

15. Other Information

The information contained in this Safety date sheet is based on the present state of knowledge and current legislation.

This safety date sheet provides guidance on health. Safety and environmental aspecs of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.

16. Reference

Chemical substances information: China Advanced Information center of Safety and Health International Chemical Safety Cards (ICSCs):
International Occupational Safety and Health Information Centre (CIS)
1999 TLVs and BELs: American Conference of Governmental Industrial Hygienists (ACGIH) Dangerous Goods Regulations-42nd Edition Effective 1 January 2001: International Air Transport Association (IATA)
MSDS of raw materials by prepared by the manufactures

;last data revised 2009/5/15

The material safety data sheet is furnished to every manufacturer as a reference to secure the safe handling of chemical. Every manufacturer is requested to carry out appropriate actions for chemical handling as their own responsibility. The supplier makes no warrantee, either express or implied. concerning of this products. User assumes all risks resulting from its use.

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