**SYNERGY SCIENTECH CORP. -- Advanced Hybrid Batteries**

***SAFETY DATA SHEET***

Manufacturer's CAGE: SYNERGY

Part No. Indicator: A

Part Number/Trade Name: AHB Series- Lithium ion Polymer batteries.

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1. General Information

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Company's Name: SYNERGY SCIENTECH CORP.

Company's Street: 6F-3, No. 9, Prosperity 1st Rd, Hsinchu Science Park, Hsinchu, Taiwan 300091 R.O.C.

Company's City: HSIN-CHU, TAIWAN

Company's Emerge Ph #: 886-3-564-3700

Company's Info Ph #: 886-3-564-3700

Record No. For Safety Entry: 001

Tot Safety Entries This Sty #: 001

Status: SMJ

Date MSDS Prepared: January 1, 2022 (15th Edition)

Safety Data Review Date: January 1, 2022

MSDS Preparer's Name: Dr. Brian Shen

Preparer's Company: SAME

MSDS Serial Number: LIASN

Battery NO:

Report NO：

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2. Hazards Identification

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Signal word

Route of Entry - Inhalation: YES

Route of Entry - Skin: YES

Route of Entry - Ingestion: YES

Health overexposure Acute and Chronic: UNDER NORM CNDTNS OF USE, THESE CHEMICALS ARE CONTAINED IN SEALED CAN. RISK OF EXPOS OCCURS ONLY IF BATTERY IS MECHANICALLY ABUSED. ACUTE: INHAL: CONTENTS OF OPENED BATTERY CAN CAUSE CONTENTS OF OPENED BATTERY CAN CAUSE IRRIT.

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO

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3. Composition/information on ingredients

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| Material Name. (e.g. Sn alloy) | Substance Name (e.g. Copper (Cu)) | CAS No. | Percentage (%) |
|---|---|---|---|
| active material | $LiCoO_2$ | 12190-79-3 | 32.62 |
| Binder-PVDF | Polyvinylidene difluoride | 24937-79-9 | 1.04 |
| Conductive material | Carbon | 1333-86-4 | 0.78 |
| Conductive material | Carbon | 1333-86-4 | 0.26 |
| Foil | Aluminum | 7429-90-5 | 4.61 |
| active material | Carbon | 1333-86-4 | 15.92 |
| Binder-PVDF | Polyvinylidene difluoride | 24937-79-9 | 1.3 |
| conductive material | Carbon | 7440-44-0 | 0.09 |
| additive | Oxalic acid | 144-62-7 | 0.05 |
| foil | Copper | 7440-50-8 | 7.87 |
| electrolyte-solvent | Ethylene carbonate | 96-49-1 | 5.06 |
| electrolyte-solvent | Diethyl carbonate | 105-58-8 | 3.72 |
| electrolyte-solvent | Ethyl methyl carbonate | 623-53-0 | 3.74 |
| electrolyte-additive | Lithium hexafluorophosphate | 21324-40-3 | 1.82 |
| electrolyte-additive | 1,3-propanesultone | 1120-71-4 | 0.09 |
| separator | Polyethylene | 9002-88-4 | 3.62 |
| tape-film | Polyimide | 75-55-8 | 0.1 |
| tape-adhesive | Acrylic | 9011-14-7 | 0.03 |
| tape-film | Polyester | 25038-59-9 | 0.14 |
| tape-adhesive | Acrylic | 9011-14-7 | 0.03 |
| Al bag | Nylon | 32131-17-2 | 3.85 |
| Al bag | Aluminum | 7429-90-5 | 9.75 |
| Al bag | Polypropylene | 9003-07-0 | 2.57 |
| tab lead | Nickel | 7440-02-0 | 0.38 |
| tab lead | polypropylene | 9003-07-0 | 0.05 |
| tab lead | Aluminum | 7429-90-5 | 0.24 |
| tab lead | polypropylene | 9003-07-0 | 0.05 |
| tab | Nickel | 7440-02-0 | 0.22 |

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4. First Aid Measures

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Explanation Carcinogenicity: NOT RELEVANT.

Signs/Symptoms of Overexposure: SEE HEALTH HAZARDS.

Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.

WASH WITH SOAP AND WATER. EYES: IMMEDIATELY FLUSH THOROUGHLY WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ATTENTION.

INGESTION: CALL MD IMMEDIATELY (FP N).

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## 5. Fire Fighting Measures

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Extinguishing Media: IN CASE OF FIRE, USE CARBON DIOXIDE OR DRY CHEMICAL EXTINGUISHERS.
Special Fire Fighting Proc: WEAR NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FPN).
Unusual Fire And Expel Hazards: NONE SPECIFIED BY MANUFACTURER.

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## 6. Accidental Release Measures

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Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering.

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## 7. Handling and Storage

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Wear suitable chemical resistant gloves, safety glasses and filtered cartridge respirator. Goggles, full face protection and other protective clothing is required if potential exists for direct exposure to liquid battery electrolyte.
In case Material is released or spilled: Carefully recover spillages with appropriate ladle and transfer to a suitably labeled, sealable container for safe disposal. Wash the spillage area neutralized with calcium hydroxide. Wear suitable personal protection during removal of spillages.
Be stored in clearly labeled, tightly closed exclusive containers in a cool, dry area.

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## 8. Exposure Controls/Personal Protection

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Ventilation: Use local exhaust.
Protective Gloves: Wear rubber or plastic gloves.
Eye/Face Protection: Wear safety glasses, goggles or full face protections.
Respiratory Protection: Wear filtered cartridge respirator or a respirator of greater protection.

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## 9. Physical and Chemical Properties

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Product Type: Solid
Appearance: Prismatic
Odor: Odorless

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## 10. Stability and Reactivity

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Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.
Hazardous Decamp Products: NONE SPECIFIED BY MANUFACTURER.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

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## 11. Toxicological Information

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In case electrolyte is spilled and explored with air, the HF could be released.
May include hydrogen fluoride and carbon oxides gas.
May cause skin and eye irritation when contacted.

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## 12. Ecological Information

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If the battery scrapped, it should be selected and disposed by professional company.

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## 13. Disposal Consideration

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Disposal should be in accordance with local, state or national legislation.

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## 14. Transport Information

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<u>The Regulation</u> : Air
All lithium ion cells and batteries shipped by themselves (UN 3480) are forbidden for transport as cargo on passenger aircraft. All packages prepared in accordance with Packing Instruction 965, Section IA and IB, must bear a Cargo Aircraft Only label, in addition to other required marks and/or labels.
A lithium battery mark is not required for packages prepared in accordance with UN 3481 Section II of PI 966 or PI 967 containing only button cell batteries installed in equipment

2021-2022 Edition of the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air (Technical Instructions) and the 63rd Edition of the IATA Dangerous Goods Regulations (DGR)

All lithium ion cells and batteries (UN 3480 only) must be shipped at a state of charge (SoC) not exceeding 30% of their rated capacity

Packing Restrictions :

A lithium battery mark must not be affixed to packages prepared in accordance with Section IA of Packing Instructions 965 and Section I and II of Packing Instructions 966, 967

| | All cells and batteries must be tested in accordance with the **UN Manual of Tests and Criteria Part III Subsection 38.3** (DGR 3.9.2.6) | | | | | |
|---|---|---|---|---|---|---|
| **UN No.** | **UN3480** | | **UN3841** | | | |
| **Packing Instructions** | **PI 965 Section IA / IB** | | **PI 967 Section I / II** | | **PI966 Section I / II** | |
| | Lithium Ion Batteries (limited to a maximum of 30% SoC) | | Lithium Ion Batteries Contained in Equipment | | Lithium Ion Batteries Packed with Equipment | |
| **Quantity Label Limit per package** | Cells > 20 Wh;<br>Batteries > 100 Wh<br>UN3480<br>PI 965<br>Section IA<br>IMP: RBI<br>  <br>Limit per package:<br>Pax A/C = Forbidden<br>CAO = 35 kg | Cells ≤ 20 Wh;<br>Batteries ≤ 100 Wh<br>UN3480<br>PI 965<br>Section IB<br>IMP: RBI<br>  <br>Limit per package:<br>Pax A/C = Forbidden<br>CAO = 10 kg | Cells >20 Wh;<br>Batteries > 100 Wh<br>UN3481<br>PI 967 Section I<br>IMP: RLI<br>  <br>Limit per package:<br>Pax A/C = 5 kg<br>CAO = 35 kg | Cells ≤20 Wh;<br>Batteries ≤100 Wh<br>UN3481<br>PI967 Section II * IMP: ELI<br>  <br>Limit per package:<br>Pax A/C = 5 kg<br>CAO = 5 kg | Cells > 20 Wh;<br>Batteries > 100 Wh<br>UN3481<br>PI 966<br>Section I<br>IMP: RLI<br>  <br>Limit per package:<br>Pax A/C = 5 kg<br>CAO = 35 kg | Cells ≤ 20 Wh;<br>Batteries ≤100 Wh<br>UN3481<br>PI 966<br>Section II<br>IMP: ELI<br>  <br>Limit per package:<br>Pax A/C = 5 kg<br>CAO = 5 kg |

UN38.3 Lithium ion cells and batteries have been successfully testing and comply with the UN Model Regulations, Manual of Test and Criteria, Part III, subsection 38.3

| PERFORMED TESTS | | | RESULTS |
|---|---|---|---|
| 38.3.4.1 | T1 | Altitude Simulation | Pass |
| 38.3.4.2 | T2 | Thermal Test | Pass |
| 38.3.4.3 | T3 | Vibration | Pass |
| 38.3.4.4 | T4 | Shock | Pass |
| 38.3.4.5 | T5 | External Short Circuit | Pass |
| 38.3.4.6 | T6 | Impact / Crush | Pass |
| 38.3.4.7 | T7 | Overcharge | Pass |
| 38.3.4.8 | T8 | Forced Discharge | Pass |

<u>The Regulation</u> : Sea

According to UN Recommendations on the Transport of Dangerous Goods - Manual of Test and Criteria, lithium battery is classified as dangerous goods in class 9. However, in marine transport, if lithium cells and batteries meet the requirement in SP188, which means they are not subject to provisions of the test and criteria, then, they can be transported as Non-Dangerous Goods .

Li Batteries in IMDG Code 39th Amendment

LITHIUM BATTERIES – Special Provision 188 of IMDG Code 40-20

(a)For a lithium alloy cell, the lithium content is not more than 1 g, and for a lithium-ion cell, the Watt-hour rating is not more than 20Wh.

(b)For a lithium alloy battery, the aggregate lithium content is not more than 2 g, and for a lithium-ion battery, the watt-hour rating is not more than 100Wh.
(c)Each cell or battery is of the type proved to meet the requirements of each test in the Manual of Tests and Criteria, Part Ⅲ, sub-section 38.3.

| Test content | Series | Standard requirement |
|---|---|---|
| Altitude Simulation | 38.3.4.1 | Cell and battery shall no leaking, venting, disassembly, rupture or fire. The open circuit voltage of test cell or battery shall not be less than 90% of the pre-test voltage after testing. The voltage requirements do not apply to test cell and battery in a fully discharged state. |
| Thermal Test | 38.3.4.2 | Cell and battery shall no leaking, venting, disassembly, rupture or fire. The open circuit voltage of test cell or battery shall not be less than 90% of the pre-test voltage after testing. The voltage requirements do not apply to test cell and battery in a fully discharged state. |
| Vibration | 38.3.4.3 | Cell and battery shall no leaking, venting, disassembly, rupture or fire during and after the test. And the open circuit voltage of each test cell or battery in the third perpendicular mounting positions shall not be less than 90% of the pre-test voltage after test. The voltage requirements do not apply to tested cell and battery in a fully discharged state. |
| Shock | 38.3.4.4 | Cell and battery shall no leaking, venting, disassembly, rupture or fire. The open circuit voltage of test cell or battery shall not be less than 90% of the pre-test voltage after testing. The voltage requirements do not apply to test cell and battery in a fully discharged state. |
| External Short Circuit | 38.3.4.5 | Cell or battery case temperature does not exceed 170°C. During test and within 6 hours after test, there shall be no disassembly, rupture or fire. |
| Impact/Crash Test | 38.3.4.6 | Impact ( applicable to cylindrical cells not less than 18mm in diameter)<br>Cell or battery case temperature does not exceed 170°C. During test and within 6 hours after test, there shall be no disassembly, rupture or fire.<br>Crush(applicable to prismatic, pouch, coin/button cell and cylindrical cell less than 18mm in diameter.)<br>Cell or battery case temperature does not exceed 170°C. During test and within 6 hours after test, there shall be no disassembly, rupture or fire. |
| Overcharge | 38.3.4.7 | During the test and within 7 days after the test, The charged battery shall be no fire or disassembly. |
| Forced Discharge | 38.3.4.8 | During the test and within 7 days after test, original or charged battery shall be no fire or disassembly. |

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## 15. Regulatory Information

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See ACGIH exposure limits information as noted in Section 3.
US: This MSDS meets/exceeds OSHA requirements
International: this MSDS conforms to European Union (UN), the International Standards Organization (ISO) and the International Labor Organization (ILO) and as documental in ANSI (American National Standards Institute) Standard Z400.1-1993.

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## 16. Other Information

Reference:

- Chemical substances information: Japan Advanced Information center of Safety and Health International Chemical Safety Cards (ICSCs): International Occupational Safety and Health Information Centre (CIS)
- 2002 TLVs and BELs: American Conference of Governmental Industrial Hygienists (ACGIH)
- 2021-2022 Edition of the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air (Technical Instructions) and the 63rd Edition of the IATA Dangerous Goods Regulations (DGR)

- LITHIUM BATTERIES – Special Provision 188 of IMDG Code 40-20
- Latest covered modification of the European Battery Directive 2006/66/EC and Amendment 2013/56/EU
- The United Nations Economic Commission for Europe (UNECE)
- MSDS of raw materials prepared by the manufactures