Date:2015.03.09
Reference Number: MSDS_ L08J87002

SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

Product Name: Lithium-ion Battery

Product Model #: ATS Lithium Ion Battery

COMPANY NAME:

Palladium Energy Inc.
1200 Internationale Parkway
Woodridge IL 60517

Telephone number: 630-410-7900
Fax number: 630-410-7990
Emergency telephone number: [Weekday] 630-410-7900

2. CHEMICAL HAZARD ID:

If shipped as class 9 hazardous goods, shipping number is UN3480 (for lithium ion batteries) or UN3481 (For battery is packed with equipment or contained in equipment)

3. COMPOSITION INFORMATION

A. Lithium-Ion Single Cell Matrix

Manufacturer of Cell	Cell Model	Type (lithium Ion or polymer)	Capacity (Ah)	Lithium Content (gm)	Cd/Hg/Pb (Yes/No)
Sanyo	UR18650A-PDE-4	Li Ion	2.15	0.645	No

B. Battery Product Matrix

Trademark	PE Part Number	Customer P/N	Pack Configuration	Pack Nominal Voltage V	Pack Nominal Capacity (Ah)	Pack Energy (Wh)	Cd/Hg/Pb
Zimmer	L08J87002	62240000600	4S2P	14.4	4.3	61.9	No

C. Chemical Composition:

Component	Material	Formula	CAS Number
Positive Electrode	Lithium Manganese Cobaltate	Li-Mn-CoO_2	12190-79-3
Negative Electrode	Graphite	C	7440-44-0/7782-42-5
Electrolyte	Organic Carbonate – Solvent	$C_3H_4O_3$ or similar	
	Lithium Hexaflurophosphate – Salt	$LiPF_6$	
Copper		Cu	7440-50-8
Iron		Fe	7439-89-6
Aluminum		Al	7429-90-5
Plastic/Electronics			

3. HAZARD IDENTIFICATION

Under normal usage, there is no contact with electrolyte and no hazard exists.
If exposed to high temperature or fire, cell may leak electrolyte and in extreme cases explode. The vented gas may contain among others Hydrogen Fluoride

4. FIRST AID

Under normal operating condition, contents of the cells are in sealed (polymer pouch/metal can or cylinder) condition and pose no threat to the user.

Exposure to the cell internal content happens under abusive conditions

Inhalation: Contents of open battery may cause respiratory irritation. Move to fresh air immediately and seek medical attention

Skin: Contents of open battery may cause skin irritation. Wash skin with copious amount of soap and water
Eye: Contents of open battery may cause eye irritation. Flush eyes immediately with water for at least 15 minutes and seek medical attention
Ingestion: Seek medical attention immediately. Induce vomiting.

5. FIRE FIGHTING

In case of Fire use CO_2 or CLASS D fire extinguisher

In case battery burns with other combustible, use corresponding fire extinguisher. Corrosive fumes may be present during fire. Use protective equipment (gloves, breathing apparatus, goggles etc.)
Gases from the burning fire will include Hydrogen Fluoride, Carbon oxides, Hydrocarbons among others.

6. ACCIDENTAL RELEASE:

Battery material is enclosed in either metal casing or in laminate and does not release easily under normal usage. Under abuse condition such as puncture, high heat exposure, electrical abuse electrolyte containing vinyl chloride salt in organic solvent may leak out. See section 4 for first aid measure. Seek medical attention.

7. INSTRUCTIONS ON SAFE HANDLING and USE

Storage: Store within the recommended temperature limit of the battery (read instruction manual for specific limits). Do not expose to high temperature (60 ^{o}C/140 ^{o}F). Avoid short circuit of the battery. Short circuit of the battery may cause release of gas and may pose burn hazard.

Handling: Do not disassemble, crush or otherwise abuse the battery. Do not open the battery.

Charge: Charge only with dedicated/specific chargers designed for this battery

Discharge: Discharge within the temperature limits of the battery detailed in the specification.

Disposal: Dispose/Recycle according to the applicable municipal, state and federal regulations. Do not dispose in household or commercial waste bin.

Caution: This battery when abused may pose fire, explosion and severe burn hazard. Handle with caution.

8. EXPOSURE CONTROL and SPECIAL PROTECTION INFORMATION:

· Control parameters

Common chemical name / General name	ACGIH (2009)	
	TLV-TWA	BEI
Lithium transition metal oxidate	0.02mg/m^3 (as cobalt) * 0.2mg/m^3 (as manganese) * 0.2 mg/m^3 (as nickel) *	-
Aluminum	10mg/m^3 (metal coarse particulate) 5mg/m^3 (inflammable powder) 5mg/m^3 (weld fume)	-
Carbon (Natural graphite) (Artificial graphite)	2mg/m^3 (inhalant coarse particulate)	-
Copper	0.2mg/m^3 (fume) 1.0mg/m^3 (a coarse particulate, Mist)	-
Organic electrolyte	-	-

ACGIH: American Conference of Governmental Industrial Hygienists, Inc.
TLV-TWA: Threshold Limit Value-Time Weighted Average concentration
BEI: Biological Exposure Indices

Eye Protection, gloves, ventilation, are not needed under normal usage

Use safety goggles, acid resistant safety gloves, air mask if exposed to internal content of the cell/battery.

9. PHYSICAL and CHEMICAL PROPERTIES:

Appearance: Solid
Form Factor: Mostly cylindrical
Odor: N/A

pH: N/A
Flash Point: N/A
Density: N/A
Solubility: Insoluble in Water

10. STABILITY and REACTIVITY:

Not reactive under normal condition of usage
Note safe handling procedure
Avoid high temperature and mechanical abuse.
Read label and manufacturer instruction before usage.

11. TOXICOLOGICAL EFFECT:

Acute Toxicity:
Not known for Lithium Cobaltate, Aluminum, and Graphite.
Copper causes gastrointestinal disturbance in 60-100mg sized coarse particulate. TDLo- Rabbit 375mg/kg
Organic electrolyte LD50, oral - -Rat 2000mg/kg or more

Local Effects:
Not known for Lithium Cobaltate, Graphite and Organic Electrolyte.
Aluminum has no known local effects.
Copper in coarse particulate is eye irritant
No known carcinogen in this product.

12. ECOLOGICAL INFORMATION

Battery is not biodegradable. Do not dispose in landfill.

13. DISPOSAL INFORMATION

Dispose/Recycle according to the applicable municipal, state and federal regulations. Do not dispose in household or commercial waste bin.

14. TRANSPORTATION INFORMATION:

UN Number: 3480 is used when shipped via air as option a) (UN3481 when battery is packed with equipment or contained in equipment)

Proper Shipping Name: Lithium ion batteries ("Lithium ion batteries packed with equipment" or "Lithium ion batteries contained in equipment")

This battery is <100 Wh and is shipped according to the regulations detailed in US Department of Transportation 49 Code of Federal Regulations for domestic shipping and Packaging instruction of IATA DGR 56th ed for international air shipping following either
a) PI965, Section 1B as CLASS 9, for lithium ion batteries
Or
b) PI965, Section II in excepted quantities which is then over packed, for lithium ion batteries,
Or
c) PI966, Section II, for lithium ion batteries packed with equipment,
Or
d) PI967, Section II, for lithium ion batteries contained in equipment.

15. REGULATORY INFORMATION:

- IATA (International Air Transport Association) Dangerous Goods Regulations 56th ed
- IMDG (International Maritime Dangerous Goods) Regulations under Special Provision 188 (nondangerous goods)
- US Department of Transportation 49 Code of Federal Regulations

16. OTHER INFORMATION:

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

-This safety data sheet provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.