



# Virtual EV and ESS High Voltage Battery Seminar, October 29-31, 2024 – 6 hours training



Shmuel De-Leon Energy, Obrist Powertrain from Austria and American Battery Solutions from the USA invites you to join 6 hours battery virtual seminar taking place as 3 parts on October 29-31, 2024.

## [Registration to seminar 3 parts - \\$499 per person](#)

- Contact us for group registration rate.

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**29 October 2024 - Part 1 - (2 hours) - starting at 16:00 PM Central Europe Time, 10:00 AM EST USA Time – Speaker: Shmuel De-Leon, Shmuel De-Leon Energy**

Part 1 includes 2 sections – EV & ESS Battery Essentials, EV & ESS Li-Ion Rechargeable

**30 October 2024 - Part 2 - (2 hours) - starting at 16:00 PM Central Europe Time, 10:00 AM EST USA Time, Speaker; Mr. Manuel Spitzlay, American Battery Solutions**

Part 2 includes 7 sections – Cells, EV & ESS Battery Pack Design, EV & ESS Battery Pack Mechanical Construction, EV & ESS Battery Pack Thermal Management, EV & ESS Battery Pack Validation Testing & Certifications, EV & ESS Battery Pack Recycling, EV & ESS Battery Pack Safety

**31 October 2024 - Part 3 - (2 hours) - starting at 16:00 PM Central Europe Time, 10:00 AM EST USA Time, Speaker; Mr. Martin Graz, Obrist Powertrain**

Part 3 includes 1 section - Obrist Powertrain – New Li-Ion Automotive Extra High Energy Density with Revolutionary Vacuum Fixation Technology

\* Registered attendants will receive the training presentation (Presentations are confidential for internal use only)

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Training Syllabus:

### **Battery Essentials**

- The strong need for batteries
- Factors Effecting Electric Vehicle Penetration
- xEV`s Terminology
- HEV, PHEV, BEV
- Xev`s Architecture
- Energy Demand Surging
- Renewable Intermittent Energy Sources
- EV`s and the Grid Storage
- Why ESS?
- Stationery and Grid Terminology
- Cells & Battery Packs
- Cells main internal components

- Cell components effect on Energy Density
- Charge/Discharge operation
- Cells formats
- Hard Case Cylindrical Cells
- Hard Case Prismatic Cells
- End of Life, Shelf Life, Cycle Life, Service/Calendar Life
- Factors Affecting Aging and State of Health
- State of Charge – State of Health
- What is a C-Rate (Apply to Charge and/or Discharge)
- Energy & Power Density

### **xEV`s and ESS Li-Ion Rechargeable Cells**

- Rechargeable Lithium Batteries and systems
- Best Performance Cells
- Lithium Rechargeable Cells Electrolyte Types
- Li-Ion Hard Case Cells Advantages, Limitations,
- Hard Case Cylindrical Cells, 18650, 21700
- The Need for Larger Lithium Ion Cylindrical Cell Sizes
- Hard Case Prismatic Cells
- Hard Case Button Cells
- Li-Ion Soft Packaging Pouch Cells, Advantages, Limitations
- Ballooned Li-Ion Pouch Cells (Swelling - Gassing)
- Lithium Iron Phosphate Batteries, Advantages, Limitations
- Why LFP is Highly Safe?
- LTO Cells, Advantages, Limitations
- Lithium Dendrite During Low Temperature Charging
- Toshiba LTO Battery - SCiB
- Lithium Rechargeable Solid State Batteries – Advantages/Limitations

## **xEV`s and ESS Battery Pack Design**

- Battery System Design
- Tesla & Nissan BEV Modular Battery Pack Design
- Battery Pack Performance Requirements
- Battery Pack Mechanical Requirements
- Battery Pack Thermal Management Specification Requirements
- Battery Pack BMS Requirements
- Battery Pack Safety Requirements
- Battery Pack Validation Testing Requirements
- High Voltage Battery Cells Selection
- Calculating Number of Cells Needed
- Calculating Pack Energy and Capacity
- Calculating Driving Range
- Calculating Final Battery Pack Energy Needed
- Calculating Battery Pack Power
- Calculating Battery Pack Voltage Range
- Design for Safety
- CID and Safety Vent
- Shut Down Separator
- Battery Pack External Safety Component Selection
- BMS Systems and Functionality
- BMS Systems Topologies
- Li-Ion Battery Packs Unbalancing
- Cells Balancing
- All Cells Technologies – Blocking Propagation Materials
- Design for Reliability and Service Life
- FMEA- Failure Modes Effects Analysis
- Lithium Batteries – Accelerated Life Testing
- Halt-Hass Process

- Design for Quality
- Computer Tools Support Battery pack Design Engineering and Analysis

### **xEV`s and ESS Battery Pack Mechanical Construction**

- Battery Pack Mechanical Construction
- Battery Pack Modular Design
- Battery Pack Mechanical Parts

### **xEV`s and ESS Battery Pack Thermal Management**

- Why is Battery Pack Thermal Management Important?
- Battery Pack Thermal Management Requirements
- Cooling Methods Comparison
- Fluid Immersion
- Heating for Cold Weather

### **xEV`s and ESS Battery Pack Validation Testing & Certifications**

- Test & Validation
- Common High Voltage Battery Standards

### **xEV`s and ESS Battery Pack Recycling**

- EV/ESS Battery Recycling
- The need for Li-Ion Battery Recycling
- Battery Recycling Benefits
- Material Content of Li-Ion Cell
- What is Needed to MAKE Recycling Practical
- 38 Companies to Recycle Li-Ion Cells in 2020
- Main Recyclers

### **xEV`s and ESS Battery Pack Charging Systems**

- Charging Standards

- Charging Solutions
- DC Charging Versus AC Charging
- Fast Charging – The Problem and Solution

### **xEV`s and ESS Battery Pack Safety**

- EV Batteries Safety
- EV Batteries are Different
- EV Battery Monitoring need Special Attention
- Battery Safety Failures Flow Chart
- Failure Propagation
- High Voltage Hazards
- Protection against Direct Contact
- High Voltage Hazard – Ground Fault Isolation Detection
- High Voltage Cables Color
- High Voltage Hazards – Interlock Loops
- High Voltage Hazard – Safety Equipment
- Safety labels
- A Crash Could Results in an explosive Fire
- Protection against Pack Crash
- Liquid Exposure
- Charging Safety
- On Board Battery Chargers
- Partly On-Board Battery Chargers
- EV Battery Fire Fighting Procedure
- Water as an Extinguishing agent

## **Obrist Powertrain – New Li-Ion Automotive Extra High Energy Density with Revolutionary Vacuum Fixation Technology – Speaker: Mr. Martin Gratz**

- Introduction OBRIST Group
  - Short Overview Hyper Hybrid Powertrain Technology
  - Short Introduction Zero Vibration Generator ZVG
  - Obrist Li-Ion Battery System
    - Development History
    - Battery Design (Vacuum Technology)
    - Performance Values
    - Thermal Management
    - Further Applications
    - Cost Estimation
  - Patents
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### **Manuel Spitzlay – Senior Technical Sales Manager with American Battery Solutions, Inc.**

Manuel is managing new customer and business engagement activities as well as the introduction of advanced battery technologies into ABS next generation energy storage applications.

Manuel brings 15 years of experience in the global battery industry and electrification segment.

Before joining American Battery Solutions in May 2024, Manuel served as Director of Sales at A123 Systems and in other technical business development roles for battery and component suppliers in Europe and North America.

Manuel holds an international BD in Automotive Engineering and Customer Service from the University of Applied Sciences in Esslingen, Germany and the Kettering University in Flint, Michigan, USA.



Shmuel De-Leon is Founder and CEO of Shmuel De-Leon Energy, Ltd.

Shmuel is a leading international expert in the business of batteries.

Prior to founding the company, Shmuel held for over 20 years various positions as a battery, engineering and

quality control team manager. Shmuel holds BSc. in mechanical engineering from Tel-Aviv University and MBA in quality control and reliability

engineering from the Technion Institute in Haifa as well as an Electronic Technician's diploma.

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## New Li-Ion Extra High Energy Density Battery with Revolutionary Vacuum Fixation Technology



**PROTECTED  
TECHNOLOGY**

### Design Features

- Revolutionary Vacuum Fixation Technology that leads to:
  - low weight with extreme specific energy density values
  - low cost and flexible battery pack design (cylindrical or pouch cells)
  - efficient air cooling system
  - fewer battery pack parts for improved cost and reliability
  - improved battery pack safety due to rigid construction
  - rugged design for challenging environments (IP69k certification)
- Thermal insulation for independence from ambient conditions (extends service life)
- Battery Management System with wireless voltage sensing (improved reliability)
- Can be designed from low (48VDC) to high voltage (1200VDC)
- Universal battery that can be customized per customer demand (modular design)
- Module aluminum housing works as a temperature heat sink, eliminating internal heat exchangers

### Potential Applications

- Automotive, truck, bus, heavy-duty transportation, electric aviation, marine
- PHEV, HEV, BEV

For battery prototypes and technology licensing, contact OBRIST Powertrain

## New Li-Ion Extra High Energy Density Battery with Revolutionary Vacuum Fixation Technology

### Technical Details PHEV (cylindrical)

- Samsung INR18650-30Q (3000mAh)
- Energy: 17.3kWh (100s16p)
- Nominal voltage: 360VDC (420V-240V)
- Continuous charge power: 26kW
- Continuous discharge power: 110kW (200kW pulse)
- Battery Dimensions: 1017 x 359 x 166mm
- Battery Weight: 98kg
- **Module energy densities: 203Wh/kg, 446Wh/l**



### Technical Details BEV (cylindrical)

- LG INR18650-MJ1 (3500mAh)
- Energy: 20.2kWh (100s16p)
- Nominal voltage: 360VDC (420V-240V)
- Continuous charge power: 10.1kW
- Continuous discharge power: 60kW
- Battery Dimensions: 1017 x 359 x 166mm
- Battery Weight: 103kg
- **Module energy densities: 224Wh/kg, 520Wh/l**



### Technical Details BEV (pouch)

- Customized (140Ah)
- Module Energy: 7.05kWh (14s1p)
- Module Nominal voltage: 50VDC (59V-34V)
- Continuous charge power: 3.5kW
- Continuous discharge power: 21kW
- Battery Dimensions: 559 x 2234 x 103mm
- Battery Weight: 30.5kg
- **Module energy densities: 231Wh/kg, 527Wh/l**



### Vacuum Fixation Technology



### Air Cooling System

