



Virtual EV and ESS High Voltage Battery Seminar 1-2 December 2020 - 5 hours training



Shmuel De-Leon Energy invites you to join 5 hours battery virtual seminar taking place as 2 parts of 2.5 hours each on 1-2 December 2020 -

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

1 December 2020 - Part 1 - (2.5 hours) - starting at 16:00 PM Central Europe Time, 10:00 AM EST USA Time

Part 1 includes 3 sections – EV & ESS Battery Essentials, EV & ESS Li-Ion Rechargeable Cells, EV & ESS Battery Pack Design

2 December, 2020 - Part 2 - (2.5 hours) - starting at 16:00 PM Central Europe Time, 10:00 AM EST USA Time

Part 2 includes 6 sections – 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

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

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
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About Shmuel De-Leon:

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.

Shmuel De-Leon/CEO

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[Signup for our weekly battery newsletter](#)

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