

16 Hours **ADVANCED** Training on

EV & HEV Battery Technology



Battery performance

Battery life improvement

Brief 1D GT-Suite simulation



IST Pvt Ltd

EV, HEV & Engine Development
Staff Augmentation
Corporate Training

Training Fees

Category	Training Fees per participant (Rs.)
Company Sponsored	8,000.00
Individual Sponsored	6,500.00

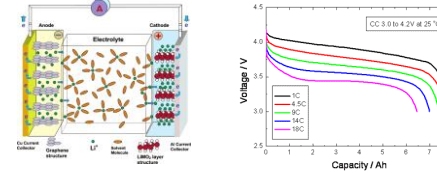
For registration, please contact us:

- E-Mail ID: subir.mandal@integratedsimtech.com
- Contact No.: **+91-9763909935**

This advanced training module is about in-depth understanding of various aspects of HEV & EV battery. Detailed training agenda is mentioned below.

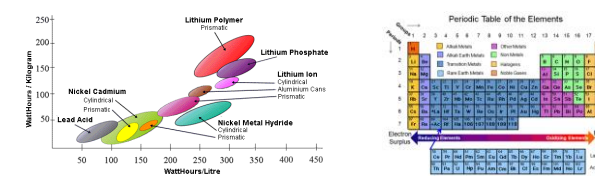
□ Battery fundamentals

- ✓ Cell and battery features
- ✓ Thermodynamic, kinetic, electrochemical
- ✓ Battery performance parameters, factors affect those parameters



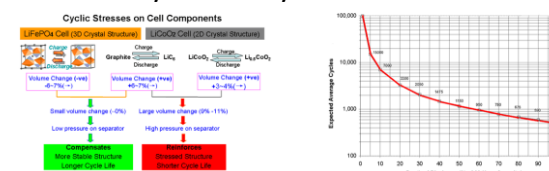
□ Battery types and materials

- ✓ Material selection – anode, cathode, electrolyte, separator, etc. Periodic table for elements
- ✓ Battery types, pros, cons, comparison, applications



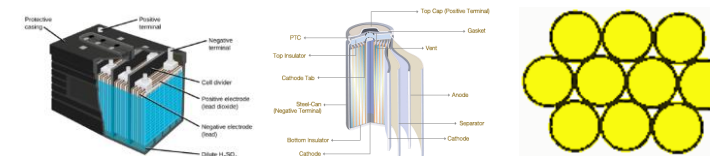
□ Battery life and death

- ✓ Cycle life, calendar life, shelf life
- ✓ Cell ageing, factors affect battery life and death
- ✓ Improve battery reliability



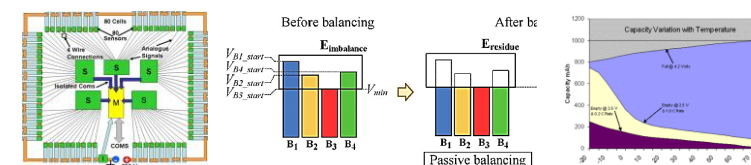
□ Battery and battery pack design

- ✓ Design consideration, variables and options
- ✓ Cylindrical, prismatic, pouch cells
- ✓ Construction, sizing, marking
- ✓ Manufacturing – electrode coating, cell assembly, formation



□ Battery management system

- ✓ Purpose, building blocks, CAN, control unit
- ✓ Sensor, computation, monitor, display, actuator
- ✓ Demand management, design consideration
- ✓ SOC estimation – purpose, factors affect, methods, theoretical vs. practical
- ✓ SOH estimation – purpose, factors affect, methods
- ✓ Cell balancing – purpose, various options
- ✓ Failure detection, diagnostic, thermal management

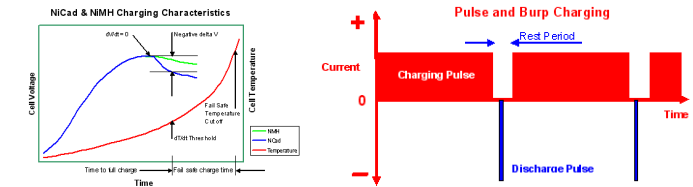


Who Should Attend?

- Working professionals/ planning to work in HEV & EV drivetrain systems, Vehicle calibration
- Battery and E-motor manufacturers
- Electric 2-wheeler and 3-wheeler electric retrofiters
- E-rickshaw manufacturers
- OEMs/ Consulting Companies/ Start-ups
- Engineering Students/ Professors/ Scholars

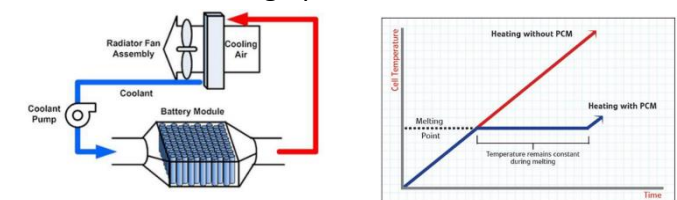
□ Battery charging

- ✓ Constant voltage (CV), constant current, (CC), CC-CV, float, pulse charging
- ✓ Temperature, overcharging, ripple, equalizing, thermal runaway, ventilation
- ✓ Technical aspects of charger and transformer



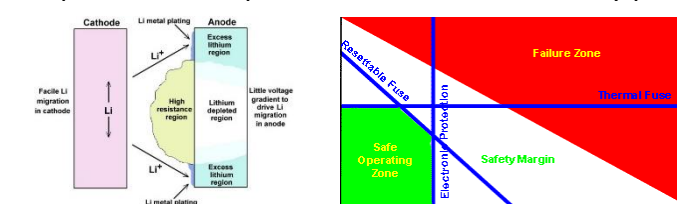
□ Battery thermal management

- ✓ Purpose, function, criteria of a good BTMS
- ✓ Cooling, heating, insulation & ventilation through active, passive, air, liquid, thermo-electric, heat pipe, PCM options
- ✓ Controls and design procedure



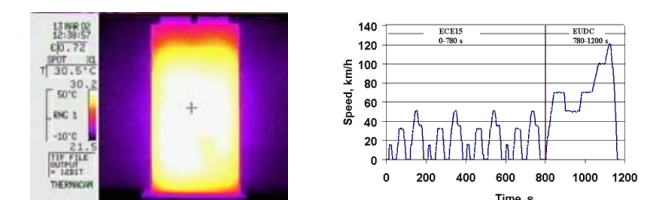
□ Battery failure, safety and maintenance

- ✓ Reasons for failure
- ✓ Failure modes
- ✓ International safety standards
- ✓ Options for cell protection - multi level safety plan



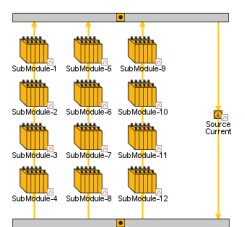
□ Battery testing

- ✓ Performance, life cycle, mechanical, casing, environmental, thermal, load and safety testing



□ Brief exposure to 1D GT-SUITE simulation

- ✓ Brief discussion on battery modeling, simulation and result interpretation



Trainer

- Over 19 years of industrial experience in diesel, gasoline, gas engines; HEV & EV; and aircraft engines
- 1D simulation domain – engine performance, cooling, HVAC, HEV & EV drivetrain, battery, lubrication, acoustics, hydraulics, cranktrain, and valvetrain
- Worked with GE, Cummins, ESI, MTU (Rolls-Royce), IST
- Conducting training for 10 years
- GT-SUITE user for 14 years
- M.Tech. from IIT Kharagpur

