MTP Objective

Topic - Design aspects of lithium-ion battery for electric vehicles

1. To estimate the influence of cathode materials on the power output characteristics of Lithium-ion batteries. The factors influencing the crack formation and growth in Lithium ions, as well as the cathode material will be investigated. In the presence of high capacity electrodes, Lithiation and delithiation is one of the main factors responsible for the short life span of Lithium-based batteries. Simulation of crack growth and hence the performance characteristics will be estimated through molecular dynamics simulations using Large-scale Atomic/Molecular Massively Parallel Simulator (LAMMPS).
2. Study the factors influencing the particle damage, considering the real-time operating conditions like temperature, humidity, to name a few.
3. To estimate overall power losses with time associated with the battery pack under operating conditions.
4. Devise the methods to reduce the power losses and enhance the battery life, e.g.: battery thermal management systems.

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