Realization of common platform technologies, facilities and equipment that create innovative knowledge and products

R&D Project Title : Development of Multi-scale Digital Feedback Loop by Integrating Non-destructive Measurement, Space-Time Inverse Analysis and Modeling

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Summary :

This project aims to establish multi-scale digital feedback loop systems by integrating non-destructive measurement, space-time inverse analysis and modeling.

Targeting the pre-production level of Li ion battery packs, the system collects non-destructive time and space distribution data by utilizing such as inverse analysis method for electromagnetic field and distribution of relaxation times (DRT) measurement. Using those data, it realizes the technology to analyze the batteries by decomposing into their cross sectional distribution and resistance components by combining the kinetic-non steady mathematical modeling of electrochemical reactions and mass transport. Next, the project aims to build up the technologies providing the design guidelines to improve the battery performance by estimating its internal phenomena.

This system can contribute shorter lead time for final product with model base development.

①**Product Battery**
Internal phenomena
Non-destructive measurement
+Space-time inverse analysis
+Modeling

③**Structure design**
Automatic optimization
Material · Process · Structure

Top down approach

Digital Feedback loop for rapid and automatic solution of actual device

Bottom up approach

②**Estimation of internal phenomena**
Breakdown to each scale phenomena

Digital "M" Feedback loop (DMF)
Material, Modeling, Measurement, Mechanism, Manufacturing

Shorter lead time of final product