Innovation in Practical Batteries (Advanced Lithium-Ion Batteries)

R&D Project Title　Development of Lithium Batteries with High Temperature Stability, Long Cycle Life and High Energy Density

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Summary :

In order to reduce GHG, high performance rechargeable new lithium batteries will be developed in this research team. The first challenge is a high temperature, 60 °C~100 °C operation of LIB. The second challenge is a long cycle life, 10000 cycle for LIB. The third one is a high energy density 500 Wh kg^{-1} for LIB & LMB. Three research and development targets will be achieved and installed in our society to reduce GHG and realize new energy social system.

In order to spread LIB used in a hot region, LIB suitable for high temperature operation have to be developed. In order to reduce GHG from LIB manufacturing and battery materials, a cycle performance of LIB should be increased to 10000 cycle. In addition, air mobility, such as drone, required higher energy density for lithium battery. LMB is the most promising candidate for such high energy density battery. These three research targets will be achieved by understanding for high temperature operation of LIB, degradation mechanisms of LIB and LMB, new cell design for LMB. In addition, research and development on new materials which can realize three targets, are very important. In this research team, material science, computational science, interfacial control technology, analysis by using synchrotron radiation and cell design are cooperated each other, based on discussion for a realization of new LIB and LMB. The research goals are divided in short term, middle term and long term. Our final goal is to reveal the ultimate form of lithium-based batteries.