Battery Development for High Safety

R&D Project Title: Development of sulfide-based all-solid-state batteries with high energy density and high safety

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Summary :

The development of all-solid-state batteries (ASSBs) with high energy density and high safety is expected. The main challenge in using high-capacity negative electrodes such as lithium metal and silicon, and high-capacity positive electrodes such as sulfur-based and Li-rich oxide materials, is that the active materials of the positive and negative electrodes undergo large volume changes during charging and discharging. In this project, solid electrolytes that combine mechanical properties, electrochemical stability, and ion conductivity suitable for these high-capacity electrodes will be developed. We also focus on interface design to form and maintain the solid-solid interface between electrode and electrolyte, battery manufacturing processes, and advanced analytical and calculation methods to elucidate the mechanisms that occur at the interface during cycling. The development targets of ASS Li-S batteries using sulfur-based positive electrodes and advanced ASS LIBs using Li-rich oxide positive electrodes are shown in the figure. We will establish fundamental technologies to accelerate the commercialization of ASSBs with high energy density and high safety, and contribute to the realization of GX in the future.