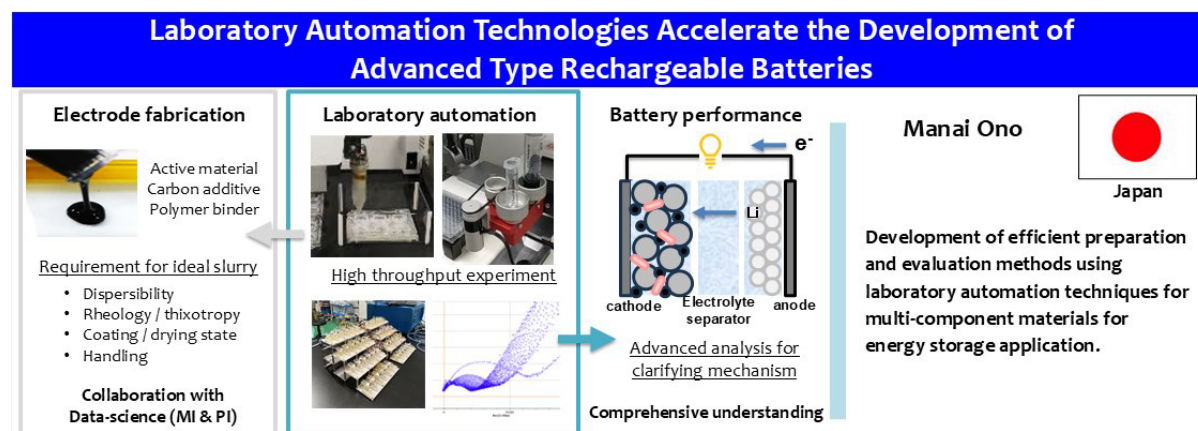


Laboratory Automation Technologies Accelerate the Development of Advanced Type Rechargeable Batteries

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■ Research

Research on energy storage materials is a critical field where accelerated research and development are urgently needed. In particular, the application of machine learning to materials development is expected to significantly enhance the efficiency of exploring vast compositional spaces and optimizing complex manufacturing processes. However, the success of such approaches largely depends on the availability of extensive and high-quality initial datasets. Against this backdrop, I have focused on laboratory automation that incorporates advanced automation technologies and AI/machine learning to refine both the fabrication processes and data analysis of electrode materials for lithium-ion batteries.

In this study, I conduct high-throughput experiments based on slurry casting, which is a widely used method for cathode fabrication in various secondary batteries, to design processes and generate datasets for analysis. By applying machine learning to the collected data, it becomes possible to efficiently explore optimal slurry formulations in multicomponent cathode systems, thereby contributing to the acceleration of LIB development. Furthermore, this approach is extendable to the fabrication of other electrodes such as all-solid-state batteries. Ultimately, the goal is to identify the key factors influencing electrochemical performance and to contribute to the advancement of battery performance and the elucidation of underlying mechanisms.

■ Comments

I have joined ICYS as a JSPS research fellow (RPD). At NIMS, I learn daily through exposure to diverse research activities, cutting-edge experimental facilities, and the outstanding expertise and technical skills of the staff. Particularly in ICYS, this environment respects individual research pursuits while offering strong technical and administrative support, as well as valuable opportunities for discussion and interdisciplinary collaboration with international members from diverse backgrounds. Through my activities, I aim to consciously incorporate new perspectives, broaden my horizons, and cultivate expertise and communication skills that will enable me to contribute unique insights. Ultimately, I aspire to become a researcher capable of conducting interdisciplinary research.

■ Link

<https://www.nims.go.jp/icys/research/#MANAI>