

Kanno Lab

Exploration of the materials intrinsic properties by synthesis, structure, and physical property analysis for developing their applications

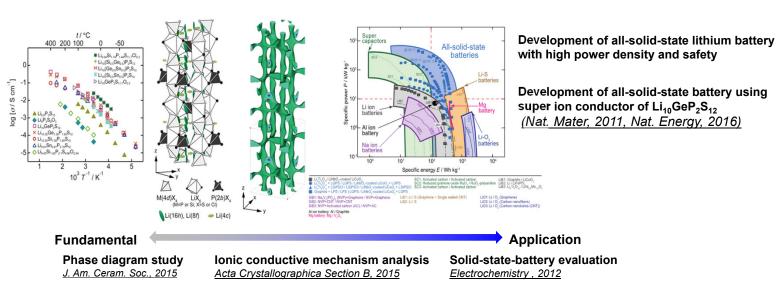
All-solid-state battery Unit

http://www.kanno.echem.titech.ac.jp/english/

phenomenon

- Solid State Ionics
- Lithium Battery Fuel Cells

Examples of our group progress ~From fundamental to application~



Analysis and design of electrochemical reaction

Development of novel electrochemical devices interface Development of new ion conductor: Reaction analysis of electrode/electrolyte interface: Lithium, oxide, hydride ions and proton model interface construction 2D ideal interface (≈1 nm) LiH⁻₄: for structure analysis Disordered · Li-H-:2-coordination Li-H-:6(5)-coordination square 4-coordication . arrangements of anions 1D H⁻ arrangement 2D H-arrangement LiH⁻₅O octahedra and vacancy Restricted by substrate lattice plane Investigation of Li diffusion orientation Surface X-ray and Neutron Scattering Surface and Bulk structural changes t-La₂LiH_{2y}O_{3.5-y} (0 ≤ y ≤ 0.5) Exclude effects of impurity Easy to control film thickness LaSrLiH2O2 Sr₂LiH₂O o-La₂LiHO₃ J. Am. Chem. Soc., 2010 Effect of Li diffusion length ②La Sr Sli H O J. Mater. Chem. A , 2014 Effect of electrode surface Hydride ion conductor with K₂NiF₄-type structure and its all-solid-state device (Science, 2016) Chem. Commun., 2015 **Fundamental Application Fundamental** Application **Device construction** Mechanism elucidation **Novel conductor** Conductive mechanism Interface design using novel conduction of interfacial reaction for high power density development analysis

Nanomaterials, epitaxial thin-film synthesis, electrode materials by high pressure synthesis synthesis and magnetic materials are also under investigated.