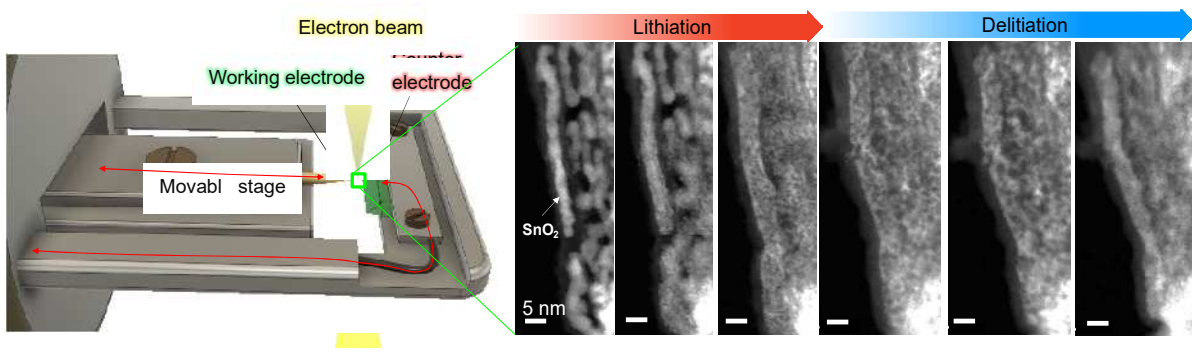


Name Notohara Hiroo	Job Title Assistant professor	Area of Expertise Electrochemistry, Nanostructural Analysis
1. Main Research Topics Elucidation of charge-discharge mechanisms in carbon nanospaces. With the expanding range of applications for energy storage devices, there is an increasing demand for higher performance secondary batteries. In lithium-ion secondary batteries, it is particularly important to develop electrode materials that can stably operate with high-capacity active materials such as Sn and SnO₂. It is known that when electrode active materials are supported within carbon nanospaces, they exhibit charge-discharge characteristics different from those in the bulk state and achieve high charge-discharge reversibility. However, the detailed mechanisms underlying these phenomena are not yet fully understood. Our research group has been synthesizing composites in which electrode active materials are loaded within carbon nanospaces. In addition to conventional structural analyses such as XRD and SEM, we have been investigating the structure and charge-discharge mechanisms of these materials at the nanoscale by combining techniques such as gas adsorption isotherm measurements, scanning transmission electron microscopy (STEM), and electron energy loss spectroscopy (EELS). In our recent studies, we elucidated the structural changes that occur during charge-discharge processes within nanospaces by STEM. We demonstrated that when SnO₂ nanoparticles are supported in the inner space of single-walled carbon nanotubes, the structural changes during charge-discharge differ from those of a bulk SnO₂ particle (see figure).  Fig. a) Schematic images of battery setup on TEM holder for in-situ STEM observation, b) Snapshots of STEM images of SnO₂ embedded single-walled carbon nanotubes during initial lithiation and delithiation process.		
2. Keywords All-solid-state battery, Nanoporous carbon, nanoparticle/porous carbon composite, in-situ STEM		
3. Remarks and Websites My research interest lies in elucidating unique phenomena originating from nanostructures, not limited to battery materials. I hope to uncover the underlying mechanisms and apply these findings to broader technological developments. researchmap: https://researchmap.jp/notohara?lang=ja Laboratory: https://www.cms.nagasaki-u.ac.jp/lab/bukka/A/top.html		