

Data-driven diagnosis and prognosis for Li metal anode battery degradation



Lecturer: Dr. Qianli Si

Department of Nanoscience and Nanoengineering
Waseda University, Japan

Time & Date: 16:00-17:30, Thursday 25 September 2025

Place: The 3rd Seminar Room, R1 bldg. Suzukakedai campus
(R1棟2F 第三会議室)

Abstract: Lithium metal batteries (LMBs) hold great promise owing to their exceptionally high theoretical capacity compared with conventional lithium-ion batteries, yet their practical deployment is limited by rapid degradation, cycle instability, and safety concerns. This talk presents data-driven approaches for accurate diagnosis and prognosis of LMB degradation, focusing on three directions: cycle life prediction from early-cycle features, State of Health (SOH) estimation using a Physics-Informed Neural Network (PINN) that integrates electrochemical knowledge, and capacity estimation with knee point (KP) prediction from electrochemical impedance spectroscopy (EIS). Together, these studies illustrate how data-driven methods can accelerate the understanding of degradation mechanisms and enable reliable diagnosis and prognosis of LMB systems.

Contact: Prof. Yoshitaka Tateyama (045-924-5277) @ Tateyama-Ando Group