

The 140th GREEN Seminar



Multimodal Approach to Evaluating Electrode Activity in Water Electrolysis

Chair: Dr. Shoichi MATSUDA (GREEN)

Assistant Prof. Masaki ITATANI

(Department of Chemistry, Faculty of Science, Hokkaido University)

Electrode activity in water electrolysis is governed not only by intrinsic reaction kinetics but also by gas-bubble nucleation, growth, coalescence, and detachment at the electrode–electrolyte interface. This seminar presents a multimodal approach that combines electrochemical measurements, bubble imaging, and acoustic emission analysis to evaluate gas-evolving electrodes. Automated image analysis is used to quantify bubble size, growth rate, residence time, gas evolution, and surface mobility during the oxygen evolution reaction (OER). In parallel, transient acoustic signals generated during OER are analyzed in the time and frequency domains. By establishing temporal correlations among electrochemical responses, observed bubble dynamics, and acoustic emission features, this approach aims to distinguish intrinsic electrode activity from bubble-mediated transport and interfacial effects. The resulting framework may also provide a basis for the non-invasive, real-time monitoring of practical water-electrolysis systems.

Venue: Rm. 409/410, 4F, Collaborative Research Bldg.,
Namiki-site

Date & Time: 15:00-16:00, Friday, 16 Oct. 2026

Language: English

Contact: MATSUDA.Shoichi@nims.go.jp