

Date: 10 January 2024 (Wednesday) Venue: Room 2402 (Lifts 17-18), [\(Location\)](#)
Time: 3 – 5 pm HKUST

Seminar I 3 – 4 pm	Vertically aligned β-Ni oxyhydroxides as highly active and stable oxygen evolution reaction catalysts Prof. Sang-Il Choi , Kyungpook National University
Seminar II 4 – 5 pm	Cation Effects on Electrocatalysis Prof. Chang Hyuck Choi , Pohang University of Science and Technology (POSTECH)

Seminar I

Vertically aligned β -Ni oxyhydroxides as highly active and stable oxygen evolution reaction catalysts

Prof. Sang-Il Choi

Associate Professor

Department of Chemistry and Green-Nano Materials Research Center

Kyungpook National University

Abstract

Nickel-based alkaline electrolyte membrane water electrolyzers (AEMWEs) have received much attention owing to the great potential for eco-friendly and massive hydrogen production. Based on the high intrinsic activity, 2-dimensional β -NiOOH has been considered one of the best candidates for anodic catalysts in AEMWEs. However, the β structure of NiOOH rapidly transforms into less active γ structure under electrocatalytic working conditions, which reduces the catalyst activity and stability and therefore limits practical application. In this talk, the vertical alignment of β -NiOOH on Ni(111) facet via ionic heteroepitaxy is introduced, in which the unique structure prevents phase transformation during the anodic reaction, resulting in exceptional catalytic activity and durability.

About the Speaker

Dr. Sang-Il Choi is currently an Associate Professor in the Department of Chemistry and Green-Nano Materials Research Center at the Kyungpook National University, Korea. He received his B.S. degree (2005) from the Sungkyunkwan University, Suwon, Gyunggi, Korea; and the Ph.D. in Inorganic Chemistry (2011) from KAIST, Daejeon, Korea. He worked as Post-doctoral research fellow at KAIST, Daejeon, Korea and at Georgia Institute of Technology, Atlanta, USA. His research aims at Synthesis of Nanocrystals and Applications of Nanomaterials.



Seminar II

Cation Effects on Electrocatalysis

Prof. Chang Hyuck Choi

Associate Professor

Department of Chemistry

Pohang University of Science and Technology (POSTECH)

Abstract

Electrocatalysis, whose reaction venue locates at the electrode-electrolyte interface, is controlled by electron transfer across the electric double layer, envisaging a mechanistic link between the electrocatalytic property and the EDL structure. One of the most intriguing questions is the mechanistic role of the alkali metal cation at the electrode-electrolyte interface, often referred to as the “cation effect”. In this presentation, I will show that the identity and activity of the alkali metal cation not only influence catalytic performance and selectivity, but can also directly affect electrode stability. To understand the puzzling “cation effect”, various control experiments and computational studies were performed to explore potential scenarios such as the cation-coupled electron transfer, the field strength modification, and the ion pairing effect. With a comprehensive understanding of alkali metal identity-dependent electrocatalysis, we propose a conceptual strategy for better electrocatalysis.

About the Speaker

Chang Hyuck Choi (CK) is currently an Associate Professor in the Department of Chemistry at Pohang University of Science and Technology (POSTECH), Korea. He received his B.S. (2007) and Ph.D. (2012) degrees from the Department of Chemical Engineering at KAIST, Korea, and worked as a Humboldt Research Fellow at the Max Planck Institute for Eisenforschung, Germany. His research aim is to understand electrocatalysis and he has published over 90 journal papers.



All are Welcome