Impact of Anode Ionomer-Catalyst Interaction on AEMFC performance and Durability

Yu Seung Kim, Sandip Maurya, Hoon Chung, Eun Joo Park, Albert Lee, Dongguo Li, Daniel P. Leonard

MPA-11: Materials Synthesis and Integrated Devices, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, United States

In this presentation, we review the cation-hydroxide-water co-adsorption on hydrogen oxidation reaction (HOR) catalyst and their impact on hydrogen and oxygen stoics and water management on anion exchange membrane fuel cells (AEMFCs). We will report the HOR voltammogram behaviors of Pt catalyst during the cumulative co-adsorption first. Their impact on kinetic current region (< 0.1 V vs. RHE) will be emphasized. The impact of the co-adsorption on electrochemical impedance spectra as a function of different anode potential will be discussed next to explain H_2 and O_2 diffusion issues in AEMFC. The co-adsorbed layer structure will be discussed with electrochemical surface FTIR and neutron reflectometry study, which provides an idea of why water management is so difficult in AEMFC. Furthermore, we will discuss how the co-adsorption accelerates anode ionomer degradation. The later part of this study will reveal the anode ionomer design strategies to mitigate the adverse cation co-adsorption.

References

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Dr. Kim is a staff scientist at Los Alamos National Laboratory and presently leads the alkaline membrane fuel cell and high-temperature PEM projects funded by US Department of Energy. His research focuses on the fundamental and applied science of fuel cells, including development of ion exchange polymer electrolytes and understanding of catalyst-ionomer interface for fuel cells. Dr. Kim received his Ph.D. from Korea Advanced Institute of Science and Technology, South Korea (1999). After three years of post-doctoral training at Virginia Tech under the supervision of Professor James E. McGrath, he joined LANL fuel cell team (2013) and has been working at the team. He has credits for > 20 US patents and is the LANL three-time Outstanding Innovation Technology Transfer awardee. He authored ~100 publications in peer reviewed journals with 14,000 times of total citations. He is the co-lead organizer for US DOE Alkaline Membrane Fuel Cell Workshop (2016 & 2019) and currently co-lead DOE FCTO Membrane Working Group.