School Seminar (2015-25)

School of Materials Science & Engineering

"Fuel Cell Developments at LANL and Perspectives"

Dr. Yu Seung Kim

(Materials Synthesis and Intergrated Device Group,
Los Alamos Nat. Lab.(USA))

2015. 08. 25. (Tue.) 11:00

APRI 1F, Auditorium Hall

Fuel Cell Developments at LANL and Perspectives

Yu Seung Kim (yskim@lanl.gov)

Cost and durability are the major challenges to fuel cell commercialization. Los Alamos National Laboratory fuel cell team has engaged several DOE-funded projects and focused on developing high-performing and durable fuel cells through new material developments. While significant progress has been made over the past years, we are now facing some technical challenges that have emerged from new material systems. In this talk, I will discuss about those issues to solicit the possible approaches via international collaborative works between US and Korea.

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Education and Training:

Postdoc	Los Alamos National Laboratory	Electrochemistry	2003-2005
Postdoc	Virginia Polytechnic and State University	Chemistry	1990-2003
Ph.D.	Korea Advanced Institute of Science and Technology	Chem. Eng.	1996-1999
M.S.	Korea Advanced Institute of Science and Technology	Chem. Eng.	1994-1996

Synergistic Activities (past 3 years)

Honors & Awards:

- 2014 Tech to Market Special Recognition from the DOE Assistant Secretary
- 2013 Los Alamos National Laboratory Outstanding Innovation Technology Transfer Award

Fuel Cell Patents (total: fifteen issued, nine pending):

1. Y.S. Kim, C. Johnston, P. Zelenay, Minimizing Electrode Contamination in an Electrochemical Cell, USP 8,906,575, September 4, 2014.
2. Y.S. Kim, B.S. Pivovar, Advanced Membrane Electrode Assemblies for Fuel Cells, USP 8,658,329, February 25, 2014.
3. Y.S. Kim, K.-S. Lee, T. Q. T. Rockward, Non-aqueous Liquid Compositions Comprising Ion Exchange Polymers, USP 8,394,298, March 12, 2013.
4. Y.S. Kim, D.S. Kim, K. S. Lee, Anion Exchange Polymer Electrolytes, USP 8,492,049, July 23, 2013, USP 8,530,109, September 10, 2013.

Other Activities:

1. Advisory Board of ACS Advances Materials for PEMFC systems (2009 – present)
2. Instructor for Los Alamos National Laboratory Fuel Cell Short Course (2009 – present)
3. Member of The Electrochemical Society (2003 - present)
4. Reviewer for more than 20 scientific journals, including top journals

Publications: 60 publications; 6 book chapters; approximately 9,000 citations (17 publications with more than 100 citations, including three with more than 1000 citations); h-index 31 (Google Scholar).

1. "A Microelectrode Study of Interfacial Reactions at the Platinum-alkaline Polymer Interface" S.D. Yim, H.T. Chung, J. Chlistunoff, D.S. Kim, C. Fujimoto, T.H. Yang, Y.S. Kim *J. Electrochem. Soc*. 162 (6) F499-F506 (2015).
2. "The Effect of Cathode Structures on Nafion Membrane Durability" B. Choi, D. A. Langlois, N. Mack, C.M. Johnston, Y.S. Kim *J. Electrochem. Soc.* 161, (12) F1154-F1162 (2014).
3. "Highly Durable Fuel Cell Electrodes based on Ionomers Dispersed in Glycerol" Y.S. Kim, C.F. Welch, N.H. Mack, R.P. Hjelm, E.B. Orler, M.E. Hawley, K.S. Lee, S.-D. Yim, C.M. Johnston *Phys. Chem. Chem. Phy.* 16 (13) 5927-5932 (2014).
4. "The Membrane-electrode Interface in PEFCs IV. The Origin and Implications of Interfacial Resistance" Y.S. Kim, B.S. Pivovar *J. Electrochem. Soc.* 157 (11), B1616-B1623 (2010).
5. "Scientific Aspects of Polymer Electrolyte Fuel Cell Durability and Degradation" R. Borup, J. Meyers, B. Pivovar, Y.S. Kim, R. Mukundan, N. Garland, D. Myers, M. Wilson, F. Garzon, D. Wood, P. Zelenay, K. More, et al. *Chem. Rev*. 107 (10) 3904-3951 (2004).