PURDUE UNIVERSITY

Seonah Jin

jinseonah@gmail.com, Jin153@purdue.edu

EDUCATION

Ph.D. Candidate, Purdue University**,** Materials Engineering — Aug. 2013–Dec. 2017 (Expected), U.S.
Advisor: Professor Lia A Stanciu
Topic of research: Development of advanced materials for detection of viral RNA and food-borne pathogens

Master of Science, Seoul National Univ., Materials Science & Engineering — Mar.2006 - Feb. 2008 South Korea
Advisor: Professor Kyung-Woo Yi
Thesis: Enhancement in hydrogen sorption properties of magnesium hydride and lithium borohydride

Bachelor of Science, Kookmin University, Materials Engineering — Mar. 2002 - Feb. 2006 South Korea
Metallurgical Engineering

RESEARCH INTEREST

Design, synthesis, and characterization of inorganic and inorganic-organic hybrid materials
Functionalized nanostructured material, Graphene-based composite material
Materials for Biosensor and Electrochemical application

PROFESSIONAL AND RESEARCH EXPERIENCES

Purdue University — Aug. 2013 – Present, West Lafayette, IN U.S.
Graduate Research Assistant in Materials Engineering
- Development of the biological element functionalized material electro-chemical biosensor platform (Impedance sensor)
- Development of graphene-based composite materials for viral RNA (dengue, zika virus) detection.
- Development of gold-based hybrid materials for immuno-detection of foodborne pathogen (*E. Coli* O157:H7).

Purdue University — Spring & Fall semester 2016, West Lafayette, IN U.S.
Teaching Assistant in Materials Engineering in Materials Engineering
- TA of the Introduction to biomaterials and Materials Characterization Laboratory

Samsung Electronics Co, Ltd. — Feb. 2008 - July 2013, Young-in, South Korea
Research staff, Energy Lab, Samsung Advanced Institute of Technology,
- Development of catalysts and materials for Fuel Cell electrode.
  - Catalyst design, synthesis (Impregnation, Polyol, and $NaBH_4$ reduction method) and characterization
  - Development of fuel cell anode catalyst for HT-PEMFC. (Ru-based core-shell catalyst)
  - Development of fuel cell cathode catalyst (Pd-Ir) for HT-PEMFC.
  - Development of non-precious metal catalyst for fuel cell cathode (Metal-Carbon-Nitrogen catalyst)
  - Development of electrode and additive materials for fuel cell anode electrode.
  - Development of durability and activity enhancing technique using metal oxide/carbon composite (CeO_2/C, TiO_2/C, WO_3/C etc.)
  - MEA fabrication for high temperature polymer electrolyte membrane fuel cell
- Planning and Initiation of a research project
- Development of materials for VOC decomposition (Porous material, and catalyst)
  - Design, synthesis and characterization of catalyst-adsorbent hybrid materials for VOC (Volatile Organic Compounds) elimination at low temperature

WEB SITES

Linkedin https://www.linkedin.com/in/seon-ah-jin-25992937
Google scholar https://scholar.google.co.kr/citations?user=gxHydn0AAAAJ&hl=en

PURDUE UNIVERSITY

Seonah Jin

jinseonah@gmail.com, Jin153@purdue.edu

Research of Porous Materials (MOF, Meso-porous materials): Synthesis and characterization of MOF (Metal Organic Frameworks) and meso-porous OMS (Ordered Meso-porous Silica) hybrid materials

- Business opportunity investigation of CCS technology (Task force team activity)

Korea Institute of Science and Technology (KIST) Feb. 2006 - Jan. 2008
Graduate Research Assistant, Materials Science and Technology Research Division, Seoul, South Korea

- Development of hydride material for hydrogen storage
- Design and synthesis of destabilized hydride system ($LiBH_4$ + Al, $LiBH_4$ + CeH_2, $LiBH_4$ + CaH_2)
- Mechano-chemical synthesis and characterization of catalyst dispersed hydrogen storage material (MgH_2+transition metal catalyst)

Korea Institute of Science and Technology (KIST) Jul. 2004 - Jan. 2006
Undergraduate Research Assistant, Metal processing research center Seoul, South Korea

- Development of Ag particle synthesis from aqueous silver solution

AWARDS AND HONORS

1. Outstanding poster award - Material Research Society, 2016 MRS spring meeting
2. Bronze award – SAMSUNG Best Paper Award 2012, "Platinum-free anode electro-catalyst and electrode for high temperature polymer electrolyte membrane fuel cell"
3. Third place best poster presentation - International Conference Hydrogen Materials Science & Chemistry of Carbon Nanomaterials (ICHMS'2007), "Reversible Hydrogen Storage in LiH/AlB_2 Composite with TiF_3"
4. Academic Excellence Scholarship - Seoul National University, 2nd Semester 2006
5. Academic Excellence Scholarship - Kookmin University (5 times; 2nd Semester 2002, 1st Semester 2003, 1st Semester 2004, 1st & 2nd Semester 2005)
6. Excellent poster presentation; Undergraduate student poster competition - Nov. 2004, Kookmin University "Prospect and present application status of titanium alloys as dental materials"

EXPERIENCES IN EXPERIMENTAL TECHNIQUES

1. **Electrochemical Analyses**
   - CV (Cyclic Voltammetry)
   - EIS (Electrochemical impedance spectroscopy)
   - RDE (Rotational Disk Electrode) technique
2. **Materials Characterization**
   - SEM (Scanning Electron Microscopy), EDX (Energy Dispersive X-ray Spectroscopy),
   - TEM (Transmission Electron Microscopy), ED (Electron Diffraction)
   - BET (N_2 adsorption/desorption method)
   - XPS (X-ray Photoelectron Spectroscopy)
   - AAS (Atomic Absorption Spectroscopy)
   - TGA-MS (Thermo-gravimetric Analysis - Mass Spectroscopy), DSC & HP-DSC (High Pressure Differential Scanning Calorimeter)
   - Powder X-ray Diffraction & Temperature-controlled in-situ XRD
   - PSA (Particle Size Analysis)
   - PCT (Pressure-Concentration-Temperature)
   - Zeta-potential analysis
   - FT-IR (Fourier transform infrared spectroscopy)

WEB SITES

Linkedin	https://www.linkedin.com/in/seon-ah-jin-25992937
Google scholar	https://scholar.google.co.kr/citations?user=gxHydn0AAAAJ&hl=en

PURDUE
UNIVERSITY

Seonah Jin

jinseonah@gmail.com, Jin153@purdue.edu

PUBLICATIONS

Total 21 publications with 773 times of citations (Until 10th April, 2017)

1. **Seon-Ah Jin,** Jae-Hyeok Shim, Young Whan Cho, Kyung-Woo Yi, "Dehydrogenation and hydrogenation characteristics of MgH_2 with transition metal fluorides", *Journal of Power Sources*, 172 (2007) 859-862
2. **Seon-Ah Jin**, Jae-Hyeok Shim, Jae-Pyoung Ahn, Young Whan Cho, Kyung-Woo Yi, "Improvement in hydrogen sorption kinetics of MgH_2 with Nb hydride catalyst", *Acta Materialia*, 55 (2007) 5073-5079
3. **Seon-Ah Jin,** Jae-Hyeok Shim, Young Whan Cho, Kyung-Woo Yi, Oleg Zabara, Maximilian Fichtner, "Reversible hydrogen storage in $LiBH_4$–Al–LiH composite powder", *Scripta Materialia*, 58 (2008) 963-965
4. Jae-Hun Kim, **Seon-Ah Jin**, Jae-Hyeok Shim, Young Whan Cho, "Reversible hydrogen storage in calcium borohydride $Ca(BH_4)_2$", *Scripta Materialia*, 58 (2008) 481-483
5. **Seon-Ah Jin,** Young-Su Lee, Jae-Hyeok Shim, Young Whan Cho, "Reversible Hydrogen Storage in $LiBH_4$–MH_2 (M = Ce, Ca) Composites", *J. Phys. Chem. C*, 112 (2008) 9520-9524
6. Ji Woo Kim, Jae-Pyoung Ahn, **Seon-Ah Jin**, Sang Hoon Lee, Hee-Suk Chung, Jae-Hyeok Shim, Young Whan Cho, Kyu Hwan Oh, "Microstructural evolution of NbF_5-doped MgH_2 exhibiting fast hydrogen sorption kinetics", *Journal of Power Sources,* 178 (2008) 373-378
7. Jae-Hun Kim, **Seon-Ah Jin**, Jae-Hyeok Shim, Young Whan Cho, "Thermal decomposition behavior of calcium borohydride $Ca(BH_4)_2$", *Journal of Alloys and Compounds*, 461 (2008) L20-L22
8. Wei He, Mei Chen, Zhiqing Zou, Zhilin Li, Xiaogang Zhang, **Seon-Ah Jin,** Dae Jong You, Chanho Pak, Hui Yang, "Oxygen reduction on Pd_3Pt_1 bimetallic nanoparticles highly loaded on different carbon supports", Applied Catalysis B: Environmental,97 (2010) 347-353
9. **Seon-Ah Jin**, Kyungjung Kwon, Chanho Pak, Hyuk Chang, "The oxygen reduction electrocatalytic activity of intermetallic compound of palladium–tin supported on tin oxide–carbon composite", *Catalysis Today*, 164 (2011) 176-180
10. Kyungjung Kwon, **Seon-Ah Jin**, Chanho Pak, Hyuk Chang, Sang Hoon Joo, Hyung Ik Lee, Jin Hoe Kim, Ji Man Kim, "Enhancement of electrochemical stability and catalytic activity of Pt nano -particles via strong metal-support interaction with sulfur-containing ordered mesoporous carbon", *Catalysis Today*, 164 (2011) 186-189
11. Dong Jin Ham, Chanho Pak, Gang Hong Bae, Suenghoon Han, Kyungjung Kwon, **Seon-Ah Jin,** Hyuk Chang, Sun Hee Choi and Jae Sung Lee, "Palladium-nickel alloys loaded on tungsten carbide as platinum-free anode electrocatalysts for polymer electrolyte membrane fuel cells", *Chemical Communications*, 47 (2011) 5792-5794
12. Kyungjung Kwon, Kang Hee Lee, **Seon-Ah Jin**, Dae Jong You, Chanho Pak, "Ceria-promoted oxygen reduction reaction in Pd-based electrocatalysts", *Electrochemistry Communications,* 13 (2011) 1067-1069
13. Dong Jin Ham, Suenghoon Han, Chanho Pak, Sang Min Ji, **Seon-Ah Jin,** Hyuk Chang, Jae Sung Lee, "High Electrochemical Performance and Stability of Co-Deposited Pd–Au on Phase-Pure Tungsten Carbide for Hydrogen Oxidation" *TOPICS IN CATALYSIS*, 2012 Published online, DOI: 10.1007/s11244-012-9875-2
14. Dae Jong You, **Seon-Ah Jin,** Kang Hee Lee, Chanho Pak, Kyoung Hwan Choi, Hyuk Chang, "Improvement of activity for oxygen reduction reaction by decoration of Ir on PdCu/C catalyst", *Catalysis Today*, 185 (2012) 138-142

WEB SITES

Linkedin https://www.linkedin.com/in/seon-ah-jin-25992937
Google scholar https://scholar.google.co.kr/citations?user=gxHydn0AAAAJ&hl=en

PURDUE UNIVERSITY

Seonah Jin

jinseonah@gmail.com, Jin153@purdue.edu

15. Sung Hyeon Park, Chang Hyuck Choi, Jae Kang Koh, Chanho Pak, **Seon-Ah Jin**, Seong Ihl Woo, "Combinatorial high-throughput screening for highly active Pd-Ir-Ce based ternary catalysts in electrochemical oxygen reduction reaction", *ACS comb sci.*, 15 (2013) 572–579
16. Hyung Chul Ham, Dhivya Manogaran, Kang Hee Lee, Kyungjung Kwon, **Seon-Ah Jin**, Dae Jong You, Chanho Pak, Gyeong S Hwang, "Enhanced oxygen reduction reaction and its underlying mechanism in Pd-Ir-Co trimetallic alloys", *J. Chem. Phys.*, 139 (2013) 201104
17. Kyungjung Kwon, **Seon-Ah Jin**, Kang Hee Lee, Dae Jong You, Chanho Pak, "Performance enhancement of Pd-based hydrogen oxidation catalysts using tungsten oxide", *Catalysis Today*, 232 (2014) 175
18. Dae Jong You, Xing Jin, Jin Hoe Kim, **Seon-Ah Jin**, Sungchul Lee, Kyoung Hwan Choi, Woon Joong Baek, Chanho Pak, Ji Man Kim, "Development of stable electrochemical catalysts using ordered mesoporous carbon/silicon carbide nanocomposites", *Int. J. Hydrogen Energy*, 40 (2015) 12352
19. **Seon-Ah Jin**, Shishir Poudyal, Ernesto E Marinero, Richard J Kuhn, Lia A Stanciu "Impedimetric Dengue Biosensor based on Functionalized Graphene Oxide Wrapped Silica Particles", Electrochim. Acta, 194 (2016) 422
20. Kyo Sung Park, **Seon-Ah Jin**, Kang Hee Lee, Junho Lee, Inyong Song, Byoung-Sun Lee, Sookyung Kim, Jeongsoo Sohn, Chanho Pak, Gunha Kim, Seok-Gwang Doo, Kyungjung Kwon Characterization of Zeolitic Imidazolate Framework–derived Polyhedral Carbonaceous Material and its Application to Electrocatalyst for Oxygen Reduction Reaction", Int. J. Electrochem. Sci 11 (2016) 9295
21. Dae Jong You, Chanho Pak, **Seon-Ah Jin**, Kang Hee Lee, Kyungjung Kwon, Kyoung Hwan Choi, Pil Won Heo, Hongchul Jang, Jun Young Kim, Ji Man Kim, "Heterogeneous Electrocatalyst of Palladium-Cobalt-Phosphorus on Carbon Support for Oxygen Reduction Reaction in High Temperature Proton Exchange Membrane Fuel Cells", Int. J. Electrochem. Sci 16 (2016) 4357

PATENTS

Total 23 patents include 13 of granted patents by United States Patent and Trademark Office.

1. Method for fabricating magnesium-based hydrogen storage material.
   (1) **Granted 2011**, 07871537 (US), (2) **Granted 2008**, KR100811116 (Korea), (3) **Granted 2012**, EP1923350 B1 (Europe), (4) Filed 2008 JP 2008-120675 (Japan)
2. Hydrogen storage material and method of forming the same. **Granted 2010**, 100044482 (Korea)
3. Method and apparatus for removing organic materials, **Granted 2016** 9352364 B2 (US)
4. Electrode catalyst for fuel cell, method of preparing electrode catalyst, and fuel cell using electrode catalyst. **Granted 2013,** 8530113 B2 (US)
5. Electrode catalyst for fuel cell, method of preparing the same, electrode for fuel cell including the electrode catalyst, and fuel cell including the electrode, Filled 2013 US20140154609 A1 (US)
6. Hybrid porous material and methods of preparing the same.
   (1) **Granted 2013**, 8552189 (US), (2) Filed 2011, EP2341031 A1 (Europe)
7. Mesoporous oxide-catalyst complex and method of preparing the mesoporous oxide-catalyst complex. **Granted 2014**, 8633131 B2(US)
8. Electrode catalyst for fuel cell, method of manufacturing the same, membrane electrode assembly including the electrode catalyst, and fuel cell including the membrane electrode assembly. **Granted 2014**, US8716168 B2 (US)
9. Electrolytic membrane for fuel cell, electrode for fuel cell, and fuel cell including the electrolytic membrane and/or the electrode. (1) Filed 2010, P2011-0027177 (Korea), (2) **Granted 2014**, US8802320 B2 (US)

WEB SITES

Linkedin	https://www.linkedin.com/in/seon-ah-jin-25992937
Google scholar	https://scholar.google.co.kr/citations?user=gxHydn0AAAAJ&hl=en

PURDUE UNIVERSITY

Seonah Jin

jinseonah@gmail.com, Jin153@purdue.edu

10. Porous oxide catalyst and method of preparing the porous oxide catalyst.
    (1) **Granted 2014**, US8889078 B2 (US), (2) Filed 2012, EP2420316 (Europe)
11. Electrode catalyst for fuel cell, method of manufacturing the same, and fuel cell using the Electrode catalyst**. (1) Granted 2015,** US8940453 B2 (US) (2) **Granted 2012,** KR101148830 (Korea)
12. Electrode catalyst for fuel cell, method of preparation, MEA including the catalyst, and fuel cell including the MEA**. (1) Granted 2015,** US8956771 B2 (US), (2) Filed 2013, EP2575202 A2 (Europe), (3) Filed 2013, CN103022518 A (China)
13. Composite, electrode catalyst including the composite, method of preparing the composite, and fuel. **Granted 2015,** US9029043 B2 (US) (3) Filed 2013, CN103227333A(China), (4) Filed 2013, EP2634850A1 (Europe)
14. Catalyst including active particles, method of preparing the catalyst, fuel cell including the catalyst, electrode including the active particles for lithium air battery, and lithium air battery including the electrode. (1) **Granted 2015,** US9123976 B2 (US) (2) Filed 2012, EP2477264 (Europe) (3) Filed 2012, 2012-0008531 (Korea) (4) **Granted 2016**, CN 102593472 B (China)
15. Electrode catalyst for fuel cell, method of preparing the same, membrane electrode assembly, and fuel cell including the same. (1) **Granted**, US9147886 B2 (US), (2) Filed 2014, EP2685537 A1 (Europe)
16. Electrode catalyst for fuel cell and fuel cell including electrode having electrode catalyst. Filed 2009, 20100151296 A1 (US)
17. Electrode catalyst for fuel cell, method of preparing the same, and membrane electrode assembly and fuel cell including electrode catalyst.
    (1) Filed 2011, KR2011-0126278 (Korea), (2) Filed 2011 20110294038 (US)
18. Method of converting carbon dioxide, and method of capturing and converting carbon dioxide. Filed 2010, P2010-0121336 (Korea), (2) Filed 2011, 20120138860 A1 (US),
19. Composite, catalyst including the same, fuel cell and lithium air battery including the same. Filed 2012, 20130196237 A1 (US)
20. Electrode catalyst for fuel cell, method of preparing the same, and membrane electrode assembly and fuel cell including electrode catalyst. Filed 2012, 20130137009 A1 (US)
21. Electrode catalyst for fuel cell, method of preparing the same, and membrane electrode assembly and fuel cell, each including the same Filed 2013, 20140162169 A1 (US)
22. Electrode catalyst for a fuel cell, method of preparing the same, and membrane electrode assembly and fuel cell including the electrode catalyst. Filed 2013, 20130149632 A1 (US)
23. Functionalized Particles for Label-Free DNA Impedimetric Biosensor for DNA and RNA Sensing, Filed 2015, 62243879 (US)

EXTRA CURRICULUM EXPERIENCES

Graduate Instructional Development Certificate (Purdue University)	2017
Peer Reviewer of ACS Applied Materials & Interfaces	2016
Member of Materials Research Society (United States)	2012 – 2014, 2016 – Present
Member and Leader (2009) of the volunteer group teaching science experiments to elementary school students	2008 – 2013
Green belt of Samsung's Six-sigma methodology (License No. GB-0823671-SEC), issued by Samsung Electronics, South Korea	2008
Member of The Korean Institute of Metals and Materials Society	2006 – 2007
Member of a student committee for library management at Kookmin University, South Korea	2003 – 2006
Member of the discussion club in School of Advanced Materials Engineering at Kookmin University, South Korea	2002 - 2006

WEB SITES

Linkedin	https://www.linkedin.com/in/seon-ah-jin-25992937
Google scholar	https://scholar.google.co.kr/citations?user=gxHydn0AAAAJ&hl=en

PURDUE
UNIVERSITY

Seonah Jin

jinseonah@gmail.com, Jin153@purdue.edu

WEB SITES

Linkedin	https://www.linkedin.com/in/seon-ah-jin-25992937
Google scholar	https://scholar.google.co.kr/citations?user=gxHydn0AAAAJ&hl=en