

# **Jae-ha Myung**

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- Nationality:** South Korea
- Date of Birth:** May 11, 1985
- Gender:** Male
- Marital status:** Married
- Education:**

**The Graduate School of Yonsei University, Seoul, Korea**  
**Ph.D., in Advanced Materials Science and Engineering**

Feb., 2009 ~Feb., 2013.

Thesis Topic: Development of Solid Oxide Fuel Cells by the Single-step Co-Firing Technique and Their Electrochemical Performances, Ph.D. Degree

Research Adviser: Professor Sang-Hoon Hyun

**The Undergraduate School of Yonsei University, Seoul, Korea**  
**B.S. in Ceramic Engineering,**

Feb., 2004 ~ Feb., 2009.

Thesis Topic: Characterization of  $\text{Li}_2\text{TiO}_3$  Catalyst to Prevent Carbon Deposition of Hydrocarbon Fueled Solid Oxide Fuel Cells, B.S. Degree

Research Adviser: Professor Sang-Hoon Hyun

**Research experiences:**

**Incheon National University**

Assistant Professor, Department of Materials Science and Engineering [From 03/2018~present]

**Korea Institute of Energy Research**

Senior Researcher, Energy Materials Laboratory [From 09/2016-02/2018]

**University of St. Andrews (United Kingdom)**

Research Fellow, John TS Irvine Group (JTSI), “Flame Solid Oxide Fuel Cells, Simple Devices to Extract Electricity Directly from natural Gas and Liquid petroleum Gas Flames” [From 09/2013 until 09/2016]

**Yonsei University (Korea)**

Post-doctor:

Green Solar Ink Research Center, “Research for Solid Oxide Fuel Cells operated by Partial Oxidation of Methane” [From 04/2013 until 09/2013]

Ph.D. student:

1. Samsung Advanced Institute of Technology, “Development of Manufacturing Techniques of Low-intermediate

Temperature Anode-supported Electrolyte via Tape-casting/co-firing [From 10/2012 till 04/2013].

2. Seoul R&BD Program, “Development of Next Generation SOFC Stacks for Operation at Low Temperature” [From 03/2008 until 11/2012].

3. Research Institute of Industrial Science & Technology (POSCO), “Development of Techniques for Manufacturing SOFC Unit Cells via Tape-casting and Co-firing” [From 03/2008 until 07/2012].

4. Korean Ministry of Knowledge Economy, “Development of High-performance/durable Cathode for Intermediate-low Temperature SOFC” [From 03/2009 until 02/2012].

#### □ Teaching experiences:

Teaching Assistant, “Thermodynamics in Materials (1) & (2)”, Department of Advanced Materials Science and Engineering, Yonsei University, Seoul (2009-2012)

#### □ Awards and Scholarship:

1. Idea Award of 3rd Korean Student Energy Competition in Pohang (2011)

2. BK21 Best Paper Award from BK21 & Advanced Materials Science and Engineering in Yonsei University (2010)

3. Internal Scholarship from Yonsei University (2009 & 2011)

4. BK21 Scholarship (2009-2011)

5. Daeha Scholarship of Academic Achievement (2008-2012)

6. External scholarship from Yonsei University (2006)

#### □ List of publications: \* These authors contributed equally to this work as first authors

1. Bharat Sharma and **Jae-ha Myung**, “Pd-based ternary alloys used for gas sensing applications: A review.” *International Journal of Hydrogen Energy* (2019).

2. Jeong Hwa Park, Kyung Taek Bae, Kyeong Joon Kim, Dong Woo Joh, Doyeub Kim, **Jae-ha Myung\***, Kang Taek Lee\*, “Ultra-fast fabrication of tape-cast anode supports for solid oxide fuel cells via resonant acoustic mixing technology”, *Ceramics International*, 45(9), 12154-12161 (2019)

3. Yukwon Jeon, Ohchan Kwon, **Jae-ha Myung**, Chanmin Lee, Gicheon Lee, SangSun Park, John T.S.Irvine, Yong-gun Shul, “Positional influence of Ru on Perovskite structured catalysts for efficient H<sub>2</sub> production process by heavy-hydrocarbon source”, *Applied Catalysis A: General*, 117111 (2019)

4. Jonghyeok Noh, **Jae-ha Myung\***, “Optimization of anode and electrolyte microstructure for Solid Oxide Fuel Cells”, *Korean Chemical Engineering Research*, 57(4), 525-530 (2019)

5. Yohan Kim<sup>†</sup>, Sung-chul Lee<sup>†</sup>, Bea-yeon Kim, **Jae-ha Myung\***, “Induction Heating of Cylindrical MoSi<sub>2</sub>-based Susceptor”, *Korean Chemical Engineering Research*, 57(4), 553-558 (2019)

6. Myunggeun Park, Jin Goo Lee, Ok Sung Jeon, Teaho Shin, **Jae-ha Myung\***, Yong Gun Shul, Coke-tolerant La<sub>2</sub>Sn<sub>2</sub>O<sub>7</sub>-Ni-Gd<sub>0.1</sub>Ce<sub>0.9</sub>O<sub>1.95</sub> composite anode for direct methane-fueled solid oxide fuel cells. *Journal of Electroceramics*, 40(4), 323-331. (2018)

7. Jin Goo Lee, Ok Sung Jeon, **Jaeha Myung**, Yong Gun Shul, One-step fabrication of surface-decorated inorganic nanowires via single-nozzle electrospinning. *Ceramics International*, 44(10), 11858-11861. (2018)
8. Sung Hwan Min , Jin Goo Lee, **Jaeha Myung**, Ok Sung Jeon, Myeong Geun Park, Kwang Hyun Ryu, Yong-Gun Shul\* Characteristics of Ba (Zr<sub>0.1</sub>Ce<sub>0.7</sub>Y<sub>0.2</sub>) O<sub>3-δ</sub> nano-powders synthesized by different wet-chemical methods for solid oxide fuel cells. *Ceramics International*, 44(1), 433-437 (2018)
9. Daehee Lee\*, **Jaeha Myung**\*, Jeiwan Tan, Sang-Hoon Hyun, John. T. S. Irvine, Joosun Kim and Jooho Moon, “Direct methane fueled solid oxide fuel cells via catalytic partial oxidation enabling complete coking tolerance of Ni based anodes”, *Journal of Power Sources*, 345, 30-40 (2017)
10. Yukwon Jeon\*, **Jae-ha Myung**\*, Sang-hoon Hyun, John T. S. Irvine and Yong-gun Shul, “Corn-cob like Nanofibres as Cathode Catalysts for an Effective Microstructure Design in Solid Oxide Fuel Cells, *Journal of Materials Chemistry A*, 5, 3966-3973 (2017)
11. Yukwon Jeon, Chanmin Lee, Junki Rhee, Gicheon Lee, **Jae-ha Myung**, Myunggeun Park, Joo-Il Park, Hisahiro Einaga, Yong-Gun Shul, “Autothermal reforming of heavy-hydrocarbon fuels by morphology controlled perovskite catalysts using carbon templates”, *Fuel*, 187 (1), 446-456 (2016)
12. **Jae-ha Myung**\*, Dragos Neagu\*, David N. Miller and John T.S. Irvine, “Switching on Electrocatalytic Activity in Solid Oxide Cells”, *Nature*, 537, 528-531 (2016) \*[News Reported in Bioportfolio](#), [PhysOrg](#), [Controlled Environments Publicnow](#), [NatureAisa](#), [Wtoutia](#), [Science Bulletin](#), [BusinessKorea](#), [Kyunghyang](#) etc.
13. **Jae-ha Myung**\*, Taeho Shin\*, Xiubing Huang, Cristian Savaniu, and John T.S. Irvine, “La<sub>1.7</sub>Ca<sub>0.3</sub>Ni<sub>0.75</sub>Cu<sub>0.25</sub>O<sub>4-δ</sub>-Layered Perovskite as Cathode on La<sub>0.9</sub>Sr<sub>0.1</sub>Ga<sub>0.8</sub>Mg<sub>0.2</sub>O<sub>3</sub> or Ce<sub>0.8</sub>Gd<sub>0.2</sub>O<sub>2</sub> Electrolyte for Intermediate Temperature Solid Oxide Fuel Cells”, *International Journal of Applied Ceramic Technology*, 13 (2), 269–273 (2016)
14. **Jae-ha Myung**, Dragos Neagu, Mark Tham and John T.S. Irvine, “in situ Tailored Nickel Nano-catalyst Layer for Internal Reforming Hydrocarbon Fueled SOFCs”, *ECS Transactions*, (2015)
15. **Jae-ha Myung**, Youn-Woo Hong, Mi Jai Lee, Dae-Woo Jeon, Young-Jin Lee, Jonghee Hwang, Tae Ho Shin,† and Jong Hoo Paik, “Structural and electrochemical characterization of K<sub>2</sub>NiF<sub>4</sub> type layered perovskite as cathode for SOFCs”, *Journal of the Korean Crystal Growth and Crystal Technology*, 25(3), 116-120 (2015)
16. TaeHo Shin\*, **Jae-ha Myung**\*, Khan M Naeem, Cristian Savaniu, John T. S. Irvine, “Ce(Mn,Fe)O<sub>2</sub> - (La,Sr)(Fe,Mn)O<sub>3</sub> composite as an active cathode for electrochemical reduction of CO<sub>2</sub> in proton conducting solid oxide electrolyser”, *Solid State Ionics*, 275 106-109 (2015)
17. **Jae-ha Myung**\*, Tae Ho Shin\*, Xiubing Huang, George Carins, John T.S. Irvine, “Enhancement of Redox Stability and Electrical Conductivity by Doping Various Metals on Ceria, Ce<sub>1-x</sub>M<sub>x</sub>O<sub>2-δ</sub> (M=Fe, Ni, Cu, Co, Mn, Ti, Zr)”, *International Journal of Hydrogen Energy*, 40 (35), 12003-12008 (2015)
18. **Jae-ha Myung**, Sun-Dong Kim, Tae Ho Shin, Daehee Lee, John T.S. Irvine, Jooho Moon and Sang-Hoon Hyun, “Nano-composite structural Ni-Sn alloy anode for high performance and durability of direct methane-fueled SOFCs”, *Journal of Materials Chemistry A*, 3, 13801-13806 (2015)
19. **Jae-ha Myung**, Taeho shin, Sun-Dong Kim, Hae-Gu Park, Jooho Moon, Sang-Hoon Hyun, “Optimization of Ni-zirconia based anode support for robust and high-performance 5 × 5 cm<sup>2</sup> sized SOFC via tape-casting/co-firing technique and nano-structured anode”, *International Journal of Hydrogen Energy*, 40 (6) 2792-2799 (2015).

20. M. M. Hossain, **Jae-ha Myung**, R. Lan, M. Cassidy, I. Burns, S. Tao and J. Irvine, “A Study of Direct Flame Solid Oxide Fuel Cell Operated with Flat Flame Burner”, *ECS Transactions*, (2015)
21. Tae Ho Shin, **Jae-ha Myung**, Maarten Verbraeken, Guntae Kim, and John T. S. Irvine, “Oxygen Deficient Layered Double Perovskite as an Active Cathode for CO<sub>2</sub> Electrolysis Using Solid Oxide Conductor”, *Faraday Discussions*, (2015)
22. **Jae-ha Myung**, Hyun-Jun Ko, Chang Hyeok Im, Jooho Moon and Sang-Hoon Hyun, “Development of solid oxide fuel cells (SOFCs) by tape-casting and single-step co-firing of monolithic laminates”, *International Journal of Hydrogen Energy*, 39 (5) 2313-2319 (2014)
23. **Jae-ha Myung**, Hyun-Jun Ko, Jong-Jon Lee, Ji-Hwan Lee, and Sang-Hoon Hyun, “Synthesis and Characterization of NiO/GDC-GDC Dual Nano-composite Powders for High-performance Methane Fuel Solid Oxide Fuel Cells”, *International Journal of Hydrogen Energy*, 37 (15) 11351-11359 (2012)
24. **Jae-ha Myung**, Hyun-Jun Ko, Hae-Gu Park, Hwan Moon, and Sang-Hoon Hyun, “Fabrication and Characterization of Planar-type SOFC Unit Cells using the Tape-casting/Lamination/Co-firing Method”, *International Journal of Hydrogen Energy*, 37 (1) 498-504 (2012)
25. Hyun Jun Ko, **Jae-ha Myung**, Ji-Hwan Lee, Sang-Hoon Hyun, and Jong Shik Chung, “Synthesis and Evaluation of (La<sub>0.6</sub>Sr<sub>0.4</sub>)(Co<sub>0.2</sub>Fe<sub>0.8</sub>)O<sub>3</sub> (LSCF) - Y<sub>0.16</sub>Zr<sub>0.92</sub>O<sub>1.96</sub> (YSZ) - Gd<sub>0.1</sub>Ce<sub>0.9</sub>O<sub>2-δ</sub> (GDC) Dual Composite SOFC Cathodes for High Performance and Durability”, *International Journal of Hydrogen Energy*, 37 (22) 17209-17216 (2012)
26. Hyun-Jun Ko, **Jae-ha Myung**, Hyun-Sang –Hoon, and Jong Shik Chung, “Synthesis of LSM-YSZ-GDC Dual Composite SOFC Cathodes for High-performance Power-generation Systems,” *Journal of Applied Electrochemistry*, 42 (4) 209-215 (2012)
27. **Jae-ha Myung**, Hyun-Jun Ko, Jong-Jin Lee, and Sang-Hoon Hyun, “Optimization of Flow Rate for Improving Performance and Stability of Ni-YSZ Based Solid Oxide Fuel Cells using CH<sub>4</sub> Fuel”, *International Journal of Electrochemical Science*, 6 (5) 1617-1629 (2011)
28. **Jae-ha Myung**, Jong-Jin Lee, and Sang-Hoon Hyun, “Performance Improvement of Oxide Catalyst-Doped Anode-Supported SOFCs for Methane Fuel,” *Electrochemical and Solid State Letters*, 13, B43-45 (2010)
29. **Jae-ha Myung**, Jong-Jin Lee, and Sang-Hoon Hyun, “Performance Improvement of Oxide Catalyst-Doped Anode-Supported SOFCs for Methane Fuel”, *ECS Transactions*, 25, 2099-2106 (2009)
30. Jong-Jin Lee, **Jae-ha Myung**, Hyun Jun Ko, and Sang-Hoon Hyun, “Preparation and Performance of CuO-GDC Anode Supported Unit Cells for Direct Utilization of Hydrocarbon Fuels”, *ECS Transactions*, 25, 1143-1148 (2009)

#### □ List of patents:

1. Sung-Jin Ahn, Dowon Jung, Chan Kwak, Heejung Park, **Jae-ha Myung**, Sang-Hoon Hyun, “Anode, Anode-Supported Electrolyte Film, Fuel Cell, And Manufacturing Method of Anode-supported Electrolyte Film”, Korean Patent Application, No. 10-2015-0052662
2. Jooho Moon, Daehee Lee, **Jae-ha Myung**, “Direct Hydrocarbon-Fueled Solid Oxide Fuel Cell”, Korean Patent Application, No.101441812

3. Sang-Hoon Hyun, **Jae-ha Myung** and Hyun-Jun Ko, “Composite for Anode of Solid Fuel Cell and the Manufacturing Method of the Same”, Korean Patent Application, No. 10-2012-0107124
4. Sang-Hoon Hyun and **Jae-ha Myung**, “SOFC Unit Cell for Hydrocarbon and the Manufacturing Method of the Same”, Korean Patent Application No. 10-2009-0050469
5. Sang-Hoon Hyun and Hae-Gu Park, **Jae-ha Myung**, “Technique for Manufacturing Planar LT-SOFC Unit Cells by the Tape casting/co-firing Method” Korean Patent Application No. 10-2009-0114562

#### □ List of presentations:

##### Invited presentations

1. New Materials, structures and concepts for Solid Oxide Cells, China Academy of Sciences, Fuzhou, China (20161208)
2. In-situ metal nano-particles growth from perovskite parent, DGIST, Daegu, Korea (20161116)
3. Innovative approach on nano-metal particles of electrodes for solid oxide cells, KICET, Jinju, Korea (20161028)
4. Innovative approach on nano-metal particles of electrodes for solid oxide cells, KIER, Daejeon, Korea (20160429)

##### International presentations

1. **Jae-ha Myung\***, “Nano-metal socketed electrode design for RSOCs performance and stability”, The 22<sup>nd</sup> International Conference on Solid State Ionics, PyeongChang, Korea (20190616)
1. HyeonGwon Jeong and **Jae-ha Myung\***, “Innovative Approach for Nano-metal Particles Socketed Electrode of Solid Oxide Cells”, Materials Challenges in Alternative and Renewable Energy 2018, Vancouver, Canada (20180822)
2. Yohan Kim and **Jae-ha Myung\***, “In-situ Growth Nano-catalyst for Diverse Energy Devices”, Materials Challenges in Alternative and Renewable Energy 2018, Vancouver, Canada (20180822)
1. **Jae-ha Myung**, Dragos Neugu, Mark Tham, John T.S. Irvine, “*in situ* Tailored Nickel Nano-catalyst Layer for Internal Reforming Hydrocarbon Fueled SOFCs” Electrochemical Society meeting 2015, Glasgow, UK, (20150728)
2. **Jae-ha Myung** and Sang-Hoon Hyun, “Effects of Sn-Doped Ni-Based Anodes on Performance and Durability of CH<sub>4</sub>-Fueled SOFCs”, 222<sup>nd</sup> Electrochemical Society meeting, Hawaii, USA (20121009)
3. **Jae-ha Myung** and Sang-Hoon Hyun, “Effects of Sn-doped Ni-GDC and Ni/GDC-GDC Anodes on Performance and Durability of Direct CH<sub>4</sub>-fueled SOFCs”, 2<sup>nd</sup> Workshop on Degradation Issues on Fuel Cells, Thessaloniki, Greece (20110921)
4. **Jae-ha Myung** and Sang-Hoon Hyun, “Optimization of Operating Conditions for Maximizing Performance of YSZ Based LT-SOFCs Using CH<sub>4</sub> Fuel”, 5<sup>th</sup> International Ege Energy Symposium and Exhibition (IEESE-5), Pamukkale, Turkey (20110630)
5. **Jae-ha Myung**, H. G. Park, and Sang-Hoon Hyun “Fabrication and Characterization of Planar-Type SOFC Unit Cells

using the Tape-Casting/Lamination/Co-firing Method”, *1st Asian SOFC Symposium*, Kyoto, Japan (20100906)

6. **Jae-ha Myung**, and Sang-Hoon Hyun, “Performance Evaluation of Oxide Catalyst-doped Ni-Zirconia and Ni-Ceria based Anodes for Methane Fueled SOFCs”, *Materials Challenges in Alternative & Renewable Energy 2010*, Cocoa beach, USA (20100221)

7. **Jae-ha Myung** and Sang-Hoon Hyun, “Performance Evaluation of Oxide Catalyst-doped Ni-Zirconia and Ni-Ceria based Anodes for Methane Fueled SOFCs”, *216th Electrochemical Society meeting*, Vienna, Austria (20091008)