

Hyun-Seog Roh

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Education

- **Ph.D. in Chem. Eng., Yonsei University, Seoul, Korea** Mar. 1997 - Aug. 2001
- Thesis: Catalytic Behavior of Supported Ni Catalysts for Methane Reforming Reactions
- **M.S. in Chem. Eng., Yonsei University, Seoul, Korea** Mar. 1995 - Feb. 1997
- Thesis: Microbial Desulfurization of Powdered Waste Tire
- **B.S. in Chem. Eng., Yonsei University, Seoul, Korea** Mar. 1991 - Feb. 1995

Career

- **Editorial board of Journal of CO2 Utilization** (IF = 8.321, JIF Quartile = Q1) Jan. 2022 -
- **Editorial board of Catalysts** (IF = 4.501, JIF Quartile = Q2) Feb. 2019 -
- **Director of BK 21 Four project** Sep. 2020 -
Dept. Environmental Energy Eng., Yonsei University, Gangwon, Korea
- **Professor** Mar. 2008 -
Dept. Environmental Energy Eng., Yonsei University, Gangwon, Korea
- **Visiting scholar** Jan. 2014 - Jan. 2015
Pacific Northwest National Lab. (PNNL), Richland, WA, USA
- **Senior researcher** Mar. 2006 - Feb. 2008
Korea Institute of Energy Research (KIER), Daejeon, Korea
- **Post-Doc.** Mar. 2004 - Feb. 2006
Pacific Northwest National Lab. (PNNL), Richland, WA, USA
- **Senior researcher (Contract)** Nov. 2002 - Feb. 2004
Korea Research Institute of Chemical Technology (KRICT), Daejeon, Korea
- **Post-Doc.** Sep. 2001 - Oct. 2002
Korea Research Institute of Chemical Technology (KRICT), Daejeon, Korea

Research field

- **Hydrogen production**
 - Methane reforming: steam reforming, oxy-reforming, CO₂ reforming of methane
 - Ethanol steam reforming
 - Water gas shift (WGS)
- **C1 chemistry**
 - Catalytic dehydration of methanol to dimethyl ether (DME) over solid-acid catalysts
 - Fischer-Tropsch synthesis
- **Bio-oil upgrade**
 - Deoxygenation
- **Desulfurization**
- **Liquid phase oxidation of aromatic compounds**
- **DeNO_x**
 - Decomposition of NO
 - Sorption
- **Microwave catalysis**
- **Synthesis of nanoporous materials** (Zeolites, MCM-41, MCM-48)
- **Inorganic membrane** (Pd-composite membrane, Zeolite-membrane)
- **VOCs removal**

Achievements

- **h-index: 60** As of June 2023
- **Top 2% Scientists** – Career-long, Single year impact 2021
- **Top 2% Scientists** – Single year impact 2020
(Selected by Professor John Ioannidis from Stanford University published in PLOS Biology)
- **Publications (SCIE): total 201** - **Q1: 117, Q2: 19, Q3: 31** As of Sept. 2022
- **Citations: 10,658**
- **Publications (SCIE): 66** - **Q1: 51, Q2: 8, Q3: 5** Recent 5 years
- **Citations: 5,495** (2017.1 – 2022.8)
- **Highly Cited Papers: 2** As of Mar., Apr. 2022
- **Patents: 27** As of Sept. 2022
- **Technology Transfer: \$200,000 USD** (1st Royalty, Contribution: 15%) Jan. 2005
'Process for Preparing Dimethyl Ether from Crude Methanol' to SK
- **Outstanding professor in research**, Yonsei University 2014, 2018, 2020

Representative publications (Recent 5 years)

- S.-Y. Ahn, K.-J. Kim, B.-J. Kim, J.-O. Shim, W.-J. Jang, H.-S. Roh, "Unravelling the active sites and structure-activity relationship on Cu-ZnO-Al₂O₃ based catalysts for water-gas shift reaction", *Appl. Catal. B*, 325, 122320 (2023) IF: **24.319** Rank (Engineering, Chemical): **1.9%**
- K.-W. Jeon, J.-K. Kim, B.-J. Kim, W.-J. Jang, Y. C. Kang, H.-S. Roh, "Ultra-stable porous yolk-shell Ni catalysts for the steam reforming of methane with alkali poisoning", *Chem. Eng. J.*, 454, 140060 (2023) IF: **16.744** Rank (Engineering, Chemical): **2.8%**
- Y.-L. Lee, K. Lee, C.H. Ko, H.-S. Roh*, "Optimization of nano-catalysts for application in compact reformers", *Chem. Eng. J.*, 431, 134299 (2022) IF: **16.744** Rank (Engineering, Chemical): **2.8%**
- Y.-L. Lee, K.-J. Kim, G.-R. Hong, S.-Y. Ahn, B.-J. Kim, H.-R. Park, S.-J. Yun, J. W. Bae, B.-H. Jeon, H.-S. Roh*, "Sulfur-tolerant Pt/CeO₂ catalyst with enhanced oxygen storage capacity by controlling the Pt content for the waste-to-hydrogen process", *ACS Sustain. Chem. Eng.*, 9(45), 15287 (2021) IF: **9.224** Rank (Engineering, Chemical): **9.9%**
- W.-J. Jang, J.-O. Shim, K.-W. Jeon, H.-S. Na, H.-M. Kim, Y.-L. Lee, H.-S. Roh*, D.-W. Jeong, "Design and scale-up of a Cr-free Fe-Al-Cu catalyst for hydrogen production from waste-derived synthesis gas", *Appl. Catal. B*, 249, 72 (2019) IF: **24.319** Rank (Engineering, Environmental): **1.9%**
- W.-J. Jang, J.-O. Shim, H.-M. Kim, S.-Y. Yoo, H.-S. Roh*, "A Review on Dry Reforming of Methane in Aspect of Catalytic Properties", *Catal. Today*, 324, 15 (2019) **[Highly Cited Papers, Citations: 265]** IF: **6.562** Rank (Chemistry, Applied): **13.9%**
- J.-O. Shim, K.-W. Jeon, W.-J. Jang, H.-S. Na, J.-W. Cho, H.-M. Kim, Y.-L. Lee, D.-W. Jeong, H.-S. Roh*, C.H. Ko, "Facile Production of Biofuel via Solvent-Free Deoxygenation of Oleic Acid Using a CoMo Catalyst", *Appl. Catal. B*, 239, 644 (2018) IF: **24.319** Rank (Engineering, Environmental): **1.9%**
- W.-J. Jang, H.-M. Kim, J.-O. Shim, S.-Y. Yoo, K.-W. Jeon, H.-S. Na, Y.-L. Lee, D.-W. Jeong, J.W. Bae, I.W. Nah, H.-S. Roh*, "Key Properties of Ni-MgO-CeO₂, Ni-MgO-ZrO₂, and Ni-MgO-Ce_(1-x)Zr_(x)O₂ Catalysts for the Reforming of Methane with Carbon Dioxide", *Green. Chem.*, 20, 1621 (2018) IF: **11.034** Rank (Green & Sustainable Science & Technology): **12.8%**
- W.-J. Jang, Y.-S. Jung, J.-O. Shim, H.-S. Roh*, W.L. Yoon, "Preparation of a Ni-MgO-Al₂O₃ Catalyst with High Activity and Resistance to Potassium Poisoning During Direct Internal Reforming of Methane in Molten Carbonate Fuel Cells", *J. Power Sources*, 378, 597 (2018) IF: **9.794** Rank (Energy & Fuels): **16.8%**