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Senior Researcher

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Education:

- 2004.9 ~ 2008.6, Ph.D. in Inorganic Chemistry, Department of Chemistry, NTU, Taiwan. Advisor: Prof. Soofin Cheng
- 2007.6 ~ 2007.9, International Exchange Ph.D. Student, Tokyo Institute of Technology, Japan, Advisor: Prof. Takashi Tatsumi
- 2002.9 ~ 2004.6, Master in Inorganic Chemistry, Department of Chemistry, National Taiwan University (NTU), Taiwan. Advisor: Prof. Soofin Cheng
- 1999.9 ~ 2002.6, Bachelor, Department of Chemistry, National Tsing-Hua University (NTHU), Taiwan. Advisor: Prof. C.T. Yeh

Research: For realizing a low-carbon society, Chem has focused on research and development of advanced catalysts, chemical reaction engineering and electrochemistry for extensive utilization of renewable energy and unused energy resources, and further recycling of carbon dioxide, which causes global warming. We are currently synthesizing new catalysts and composite materials for many chemical reaction systems for highly efficient production of energy carriers/fuels (ammonia, methane, light hydrocarbons and biofuels) using renewable hydrogen, biomass and recyclable CO₂ as feedstocks. He is also studying on new chemical engineering and reaction system, which can utilize renewable electricity for the purpose as aforementioned. Chen has published more than 50 peer-reviewed papers and patents in the fields of heterogenous catalysis, particularly micro- and meso-porous materials for fine chemical synthesis, petroleum/biomass conversion and refining, ammonia synthesis and methane decomposition.

Selected Projects dealt

- 2024 ~ present, Research and Development of Catalyst and Energy Process for Adsorptive Separation of Ammonia

- 2023 ~ present, Research and Development of Catalyst and Energy Process for Synthetic Fuels
- 2020 ~ present, Research and Development of Catalyst and Energy Process for Direct Air Capture and Conversion
- 2018 ~ 2022, Research and Development of Methane Decomposition for Hydrogen Production
- 2016 ~ now, Research and Development of Ammonia Synthesis Catalysts.
- 2012 ~ 2015, Innovation on Production and Automotive Utilization of Biofuels from Non-food Biomass (https://www.jst.go.jp/global/english/kadai/h2110_thailand.html)

Selected Publications:

1. Wenye Xuan, Yu-Hao Liu, **Shih-Yuan Chen**, Matthew S. Dyer, Hsin-Yi Tiffany Chen,* DFT and ML topics, Unveiling the Morphology of Carbon Supported Ru Nanoparticles by Multiscale Modelling, *Nano Letters*, 2024, 24, 9, 2689-2697. (<https://doi.org/10.1021/acs.nanolett.3c03796>)
2. **Shih-Yuan Chen**,* Li-Yu Wang, Kai-Chun Chen, Cheng-Hsi Yeh, Wei-Chih Hsiao, Hsin-Yu Chen, Masayasu Nishi, Martin Keller, Chih-Li Chang, Chien-Neng Liao, Takehisa Mochizuki, Hsin-Yi Tiffany Chen,* Ho-Hsiu Chou,* Chia-Min Yang,* Ammonia synthesis over cesium-promoted mesoporous-carbon-supported ruthenium catalysts: Impact of graphitization degree of the carbon support, *Applied Catalysis B: Environmental and Energy*, 2024, 346(5) 123725. (<https://doi.org/10.1016/j.apcatb.2024.123725>)
3. Monruedee Srida, **Shih-Yuan Chen**,*, Siwaporn Mejoo Smith, Chawalit Ngamcharussrivichaid, Supakorn Boonyuen, Hiroyuki Tateno, Takehisa Mochizuki, Apanee Luengnaruemitchaia,* Bifunctional mesoporous silica solid acids for transformation of glucose to 5-hydroxymethylfurfural, *Materials Today Sustainability*, **2023**, 24, 100470. (<https://doi.org/10.1016/j.mtsust.2023.100470>)
4. Keisuke Kobayashi, Rahat Javaid, Yuichi Manaka, Tetsuya Nanba, Masayasu Nishi, Takehisa Mochizuki, **Shih-Yuan Chen**, Hideyuki Takagi,* Comparison of Several Ammonia Catalysts Worked Under Industrial Conditions, *CO₂ Free Ammonia as an Energy Carrier*, 263-278, 2023. (Book, Springer, Singapore)
5. Chih-Li Chang, Wei-Cheng Lin, Li-Yu Ting, Chin-Hsuan Shih, **Shih-Yuan Chen**, Chia-Yeh Lu, Hiroyuki Tateno, Jayachandran Jayakumar, Che-Yi Chu, Chin-Wen Chen, Chi-Hua Yu, Yu-Jung Lu, Takehisa Mochizuki, and Ho-Hsiu Chou,* Boosting visible-light-driven hydrogen evolution of polymer photocatalysts by a universal main-chain-engineering strategy of hydrophilic non-conjugated building blocks,

Nature Communications, **2022**, 13 (1), 1-11. (<https://doi.org/10.1038/s41467-022-33211-1>)

6. Masayasu Nishi,* **Shih-Yuan Chen**,* Hiroyuki Tateno, Takehisa Mochizuki, Hideyuki Takagi, and Tetsuya Nanba, A Super-growth Carbon Nanotubes-supported, Cs-promoted Ru Catalyst for 1-8 MPaG Ammonia Synthesis, *Journal of Catalysis*, **2022**, 413, 623-635. (<https://doi.org/10.1016/j.jcat.2022.07.015> 23 July 2022).
7. Fumihiko Kosaka*, Tomone Sasayama, Yanyong Liu, **Shih-Yuan Chen**, Takehisa Mochizuki, Koichi Matsuoka, Atsushi Urakawa, and Koji Kuramoto, Continuous CO₂ Capture and CH₄ Production using Dual Function Materials in a Circulating Fluidized Bed System, *Chemical Engineering Journal*, **2022**, 450, Part 2, 138055. (<https://doi.org/10.1016/j.cej.2022.138055> December 2022).
8. Hiroyuki Tateno,* **Shin-Yuan Chen**, Yugo Miseki, Tomohiko Nakajima, Takehisa Mochizuki, Kazuhiro Sayama Photo-electrochemical Oxidation of Glycerol to Dihydroxyacetone over Acid resistant Ta:BiVO₄ photoanodes, *ACS Sustainable Chemistry & Engineering*, **2022**, 10, 23, 7586–7594. (<https://doi.org/10.1021/acssuschemeng.2c01282>, June 2, 2022).
9. Tomone Sasayama, Fumihiko Kosaka,* Yanyong Liu, Toshiaki Yamaguchi, **Shih-Yuan Chen**, Takehisa Mochizuki, Atsushi Urakawa, Koji Kuramoto, Integrated CO₂ capture and selective conversion to syngas using transition-metal-free Na/ γ -Al₂O₃ dual-function material, *Journal of CO₂ Utilization*, **2022**, 102049. (<https://doi.org/10.1016/j.jcou.2022.102049> 13 May 2022).
10. **Shih-Yuan Chen**,* Chih-Li Chang, Masayasu Nishi, Wei-Chih Hsiao, Yves Ira A. Reyes, Hiroyuki Tateno, Ho-Hsiu Chou,* Chia-Min Yang,* Tiffany Hsin-Yi Chen,* Takehisa Mochizuki, Hideyuki Takagi and Tetsuya Nanba, Unraveling the roles of Cs for ammonia synthesis over Cs-promoted Ru/ γ -Al₂O₃ catalysts for mild ammonia synthesis, *Applied Catalysis B: Environmental*, **2022**, 310, 121269 (<https://doi.org/10.1016/j.apcatb.2022.121269>; **5th August 2022**).