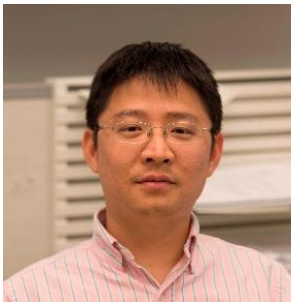
Curriculum Vitae

I. BIOGRAPHICAL DATA



Name: Hua Song
Date of Birth: December 11, 1978
Present Position: Professor
Full Address: EEEL 457B, 2500 University Drive NW, Calgary, Alberta T2N 1N4
E-mail: sonh@ucalgary.ca
Group Website: https://www.ucalgary.ca/groups/gcrg/home
Citizenship: United States of America

II. PROFESSIONAL RECORD

A. Academic Record

i) Undergraduate:
B.Sc., July 2001
Chemical Engineering
Northwestern Polytechnical University, Xi'an, P.R. China

ii) Graduate:
M.Sc., July 2004
Chemical Engineering
Tsinghua University, Beijing, P.R. China

Ph.D., June 2009
Chemical Engineering
The Ohio State University, Columbus, USA

B. Academic and Other Appointments

i) Full Professor at University of Calgary, July 2023 – Present
ii) Associate Professor (Tenured) at University of Calgary, July 2017 – June 2023
iii) Visiting scholar at University of California, Berkeley, July 2018 - June 2019
iv) Assistant Professor at University of Calgary, July 2012 - June 2017
v) Research Chemical Engineer II at RTI International, January 2011 - June 2012
vi) Lead Research Engineer at Babcock & Wilcox, June 2009 - December 2010

C. Administrative Responsibilities

None

D. Professional Certification and Memberships in Learned Societies

i) Professional Engineer, February 2013 – Present

E. Awards, Distinctions and Fellowships

i) Eyes High Doctoral Recruitment Scholarship Award, University of Calgary, November 2015
ii) Mitacs Globalink Research Award, Mitacs, May 2015 - 2023
iii) URGC Conference Travel Award, University of Calgary, May 2015
iv) Zandmer New Faculty Research Award, University of Calgary, February 2014
v) Kokes Travel Award winner for the 21st North American Catalysis Society Meeting, March 2009
vi) 2nd place winner in the 2008 Ohio Fuel Cell Symposium Poster Competition, May 2008
vii) Outstanding Graduate Award for Academic Achievement at Ohio State University, April 2008

III. EDUCATIONAL ACTIVITIES

A. Instruction

i) Undergraduate Level:

- Separation Process II (undergraduate core course: lecture, lab, and tutorial), ENCH 505 (Fall 2013~2016, 2019~2024)
- Engineering Thermodynamics (undergraduate core course: lecture and tutorial), ENGG 311 (Winter 2020~2021)
- Probability, Statistics and Machine Learning (undergraduate core course: lecture and tutorial), ENDG 319 (Fall 2017, Fall 2022~2024)
- Energy Engineering Thermodynamics (undergraduate core course: lecture and tutorial), ENER 560 (Fall 2017)
- Chemical Engineering Laboratory (undergraduate core course: lab), ENCH 551 (Fall 2012~2015, Fall 2019~2020)
- Chemical Process Design II (undergraduate core course), ENCH 531 (Winter 2015, 2020~2023)
- Chemical Process Design I (undergraduate core course), ENCH 511 (Fall 2013~ 2015, 2019~2023)
- Introduction to Instrumental Characterization Techniques (technical elective, self-created, lecture & tutorial), ENCH 519 (Winter 2014)

ii) Graduate Level:

- Chemical Thermodynamics (graduate core course: lecture), ENCH 633 (Winter 2013 and 2014)
- Error Analysis and Experimental Design (graduate core course: lecture and tutorial), ENCH 701 (Winter 2016~2018, 2022~2023)

iii) Invited seminars/lectures:

- "Methane Assisted Catalytic Biomass Valorization", China University of Mining and Technology, Xuzhou, Jiangsu, China, May 25, 2023
- "Methane Assisted Catalytic Crude Oil Upgrading", China University of Petroleum (East China), Qingdao, China, May 23, 2023
- "Non-thermal Plasma Assisted Low-cost Resources Valorization under Methane", Shandong University, Jinan, Shandong, China, May 22, 2023
- "Methane Assisted Catalytic Biomass Valorization", Xi'an Jiaotong University, Xi'an, Shaanxi, China, April 27, 2023
- "Methane assisted catalytic biomass valorization", ACS Spring 2023 National Meeting, Indianapolis, IN, March 2023
- "Heterogeneous Catalysis and Its Applications in Energy Conversion and Environmental Control", China University of Petroleum (East China), Qingdao, China, June 27-July 7, 2022
- "Methane Assisted Catalytic Valorization of Low-Cost Carbon Resources", Xi'an Jiaotong University, Xi'an, Shaanxi, China, June 2022
- "Heterogeneous Catalysis and Its Applications in Energy Conversion and Environmental Control", China University of Petroleum (East China), Qingdao, China, July 5-8, 2021
- "Low-temperature Methane Activation and its Utilizations", Shanghai Jiaotong University, Shanghai, China, November 2, 2020
- "Catalytic Carbon Sources Upgrading under Methane Environment", Shanghai Tech University, Shanghai, China, June 18, 2019
- "Catalytic Carbon Sources Upgrading under Methane Environment", University of California, Berkeley, United States, March 26, 2019
- "Catalytic Carbon Sources Upgrading under Methane Environment", Synfuels China, Beijing, China, August 30, 2018
- "Catalytic Carbon Sources Upgrading under Methane Environment", Guangxi University, Nanjing, China, June 13, 2018
- "Catalytic Low-cost Carbon Sources Upgrading under Methane Environment", Soochow University, Suzhou, China, June 11, 2018

- "Catalytic Carbon Sources Upgrading under Methane Environment", Tsinghua University, Beijing, China, January 10, 2017
- "Catalytic Valorization of Municipal Solid Wastes", Shandong Chambroad Petrochemicals, Binzhou, China, July 6, 2016
- "Preparation and Characterization of Biomass-derived Materials", Zhejiang University of Technology, Hangzhou, China, June 16-17, 2016
- "Catalysis – The Way of Changing Our Energy Perspective", Shandong Chambroad Petrochemicals, Binzhou, China, June 6, 2016
- "Catalytic Bitumen Upgrading under Methane Environment", China University of Petroleum (East China), June 4, 2016
- "Natural Gas – The Clean Fossil Fuel to Power Our Future", East China University of Science and Technology, Shanghai, China, January 4, 2016
- "Catalytic Heavy Crude Oil Upgrading Using Natural Gas", China University of Petroleum (East China), August 5, 2015
- "Natural Gas – The Clean Fossil Fuel to Power Our Future", Zhejiang University of Technology, Hangzhou, China, July 6, 2015
- "Green Catalysis– The Way of facilitating sustainable energy development", State Grid Corporation of China, Beijing, China, August 29, 2014
- "Natural Gas – The Clean Fossil Fuel to Power Our Future", Xi'an Shiyou University, Xi'an, China, May 22, 2014
- "Catalysis – The Way of Changing Our Energy Perspective", University of Science and Technology Beijing, December 30, 2013
- "Natural Gas – The Clean Fossil Fuel to Power Our Future", Changzhou University, Changzhou, China, December 24, 2013

B. Graduate and Undergraduate Supervision

i) Current graduate students:
- Min Kim, Chemical and Petroleum Engineering, M.Sc., September 2024 ~ August 2026
- Rehan Qureshi, Chemical and Petroleum Engineering, M.Sc., September 2024 ~ August 2026
- Milad Zehtab Salmasi, Chemical and Petroleum Engineering, Ph.D., July 2023 ~ June 2027
- Razieh Eshaghian, Chemical and Petroleum Engineering, Ph.D., September 2024 ~ August 2028
- Ninad Anjikar, Chemical and Petroleum Engineering, Ph.D., September 2024 ~ August 2028

ii) List of past-supervised graduate students:
- Ali Omidkar, Chemical and Petroleum Engineering, M.Sc., September 2022 ~ August 2024
- Shijun Meng, Chemical and Petroleum Engineering, Ph.D., May 2019 ~ April 2023
- Jack Jarvis, Chemical and Petroleum Engineering, Ph.D., September 2018 ~ April 2023
- Yimeng Li, Chemical and Petroleum Engineering, M.Sc., January 2020 ~ April 2022
- Aiguo Wang, Chemical and Petroleum Engineering, Ph.D., September 2015 ~ August 2018
- Peng He, Chemical and Petroleum Engineering, Ph.D., January 2014 ~ December 2017
- Shize Chen, Chemical and Petroleum Engineering, M.Sc., January 2017 ~ September 2019
- Shijun Meng, Chemical and Petroleum Engineering, M.Sc., September 2017 ~ April 2019
- Jack Jarvis, Chemical and Petroleum Engineering, M.Sc., September 2016 ~ August 2018
- Danielle Austin, Chemical and Petroleum Engineering, M.Sc., May 2016 ~ April 2018
- Yingqi Luan, Chemical and Petroleum Engineering, M.Eng., May 2014 ~ April 2016
- Lulu Zhao, Chemical and Petroleum Engineering, M.Eng., May 2014 ~ April 2016
- Honghong Shi (*Co-supervised*), Chemical and Petroleum Engineering, M.Sc., January 2013 ~ December 2014

iii) Examiner/supervision committee:
- Jiu Wang, Chemical and Petroleum Engineering, Ph.D. candidacy Defense, August 2024
- Yanna Liu, Mechanical and Manufacturing Engineering, Ph.D. Defense, April 2023
- Jiu Wang, Chemical and Petroleum Engineering, Ph.D. candidacy exam, August 2022

- Yanna Liu, Mechanical and Manufacturing Engineering, Ph.D. candidacy exam, March 2021
- Bo Min Kim, Mechanical and Manufacturing Engineering, M.Sc. Defense, August 31, 2020
- Xinyao Liu, Chemical and Petroleum Engineering, M.Sc. Defense, August 27, 2020
- Yuhai Du, Chemical and Petroleum Engineering, M.Eng. Defense, July 20, 2020
- Camilla Fernandes de Oliveira, Chemical and Petroleum Engineering, M.Sc. Defense, May 1, 2020
- David Shi, Chemical and Petroleum Engineering, M.Sc. Defense, April 30, 2020
- Zhenyu Xing, Mechanical and Manufacturing Engineering, Ph.D. Defense, April 29, 2020
- Yecan Wang, Chemical and Petroleum Engineering, M.Sc. Defense, October 10, 2019
- Pradeep Shrestha, Chemical and Petroleum Engineering, M.Sc. Defense, September 12, 2019
- Ran Li, Chemical and Petroleum Engineering, Ph.D. Defense, June 10, 2019
- Ran Li, Chemical and Petroleum Engineering, Ph.D. candidacy exam, August 2018
- Neeraj Prakash, Mechanical and Manufacturing Engineering, M.Sc. Defense, April 2018
- Jiujie Cai, Chemical and Petroleum Engineering, Ph.D. candidacy exam, December 2017
- Qiaohong Wang, Chemical and Petroleum Engineering, M. Eng. Defense, September 2017
- Qian Shan, Mechanical and Manufacturing Engineering, Ph.D. candidacy exam, August 2017
- Yuanchao Feng, Chemical and Petroleum Engineering, Ph.D. Defense, June 2017
- Yuan Li, Mechanical and Manufacturing Engineering, Ph.D. candidacy exam, August 2016
- Jiabin Zhou, Mechanical and Manufacturing Engineering, M.Sc. Defense, August 2016
- Yuanchao Feng, Mechanical and Manufacturing Engineering, Ph.D. candidacy exam, April 2016
- Ran Li, Chemical and Petroleum Engineering, M.Sc. Defense, March 2016
- Qiang Deng, Mechanical and Manufacturing Engineering, M. Eng. Defense, April 2015
- Belal Jum'ah Abu Tarboush, Chemical and Petroleum Engineering, Ph.D. Defense, January 2014
- Shubha Shalini Vincent, Chemical and Petroleum Engineering, M.Sc. Defense, August 2013
- Yang Yang, Mechanical and Manufacturing Engineering, Ph.D. Defense, August 2013
- Shamiul Islam, Chemical and Petroleum Engineering, Ph.D. Defense, February 2013
- Mohamad Mojarab, Chemical and Petroleum Engineering, Ph.D. Candidacy exam, 2013

iv) External Examiner:
- Ali Faghihnejad, Chemical & Materials Engineering, University of Alberta, Ph.D. Defense, July 2013

v) Supervision of visiting/exchange students:
- Wei Cheng, China University of Petroleum (East China), January ~ August 2015

vi) Supervision of senior undergraduate students (working in my research group):
- Gyungmin Kim, Chemical and Petroleum Engineering, University of Calgary, Summer 2024
- Saana Tandon, Chemical Engineering, Indian Institute of Technology Roorkee, Summer 2023 through Mitacs Globalink
- Fay He, Chemical and Petroleum Engineering, University of Calgary, Fall 2019 ~ Winter 2020
- Yilei Han, Chemical Engineering, Tsinghua University, Summer 2018 through Mitacs Globalink
- Ashley Wong, Chemical and Petroleum Engineering, University of Calgary, Summer 2017
- Casey Kou, Chemical and Petroleum Engineering, University of Calgary, Winter 2017
- Yumeng Wen, Chemical & Materials Engineering, University of Alberta, Summer 2016
- Richard Gatip, Chemical and Petroleum Engineering, University of Calgary, Summer 2016
- Carlos Castaneda Trujillo, Summer 2015 through Mitacs Globalink
- Jacqueline Liu, Chemical Engineering, McGill University, Summer 2015
- José Humberto Ramírez Leyva, Universidad de las Américas Puebla, Summer 2014 through Mitacs Globalink

C. Postdoctoral Fellow Trainees

- Ben Nadeau, Ionic Liquid Based Catalyst Development for CO2 Mineralization and Biomass Valorization, March 2025, March 2026
- Qing An, Synergistic Non-thermal Plasma-Biocatalytic System for Sustainable Methane-to-Methanol Conversion, April 2025 ~ April 2026

- Shushil Rai, Non-thermal Plasma Assisted Bio-photo Hybridized Catalytic Valorization of Low-cost Light Hydrocarbons, February 2025 ~ January 2026
- Xiaoyang Liu, Modeling and software development for crudes blending, September 2024 ~ August 2025
- Amir Narimani, Development of low-temperature methane fuel cell, September 2024 ~ August 2025
- Yanna Liu, Nonthermal plasma assisted catalytic N_2 fixation, January 2024 ~ December 2025
- Avinash Alagumalai, Machine learning enabled catalyst discovery for renewable diesel synthesis under methane environment, June 2023 ~ May 2024
- Muhammad Faizan, Methane assisted Organic Solid Wastes Upgrading, March 2023 ~ February 2024
- Hoang Nguyen Minh, Non-thermal Plasma Assisted Catalytic Liquid Phase Upgrading, September 2022 ~ August 2024
- Manpreet Kaur, Photo/Electro Assisted Catalytic Methane Conversion, July 2022 ~ August 2024
- Mingyuan Cao, Machine-Learning-Oriented Non-Thermal Plasma-Catalysis Integrated Model for Virtual Dry Reforming of Methane with Carbon Dioxide Catalyst Screening: "Fingerprints" to "Target" funded by Eyes High Postdoctoral Match-Funding Fellowship, September 2022 ~ August 2024
- Wenping Li, Non-Thermal Plasma Assisted Photocatalytic Water Splitting and Air Purification funded by NSERC Alliance Mission Grant, November 2020 ~ October 2024
- Hao Xu, Methane Assisted Catalytic Heavy Crude Upgrading funded by Mitacs Accelerate Scholarship, September 2019 ~ September 2022
- Aiguo Wang, Photoelectric catalytic methane valorization, October 2018 ~ September 2020
- Peng He, Catalytic Heavy Conventional Upgrading Using Natural Gas funded by Kara Technologies, January 2018 ~ September 2019
- Jonathan Harrhy, Non-thermal Plasma Assisted Catalytic Bitumen Partial Upgrading under Methane funded by Imperial Oil and NSERC, November 2017 ~ April 2019
- Qingyin Li, Aromatics Formation from Paraffin-rich Oil under Methane funded by Shandong Chambroad Petrochemicals, October 2015 ~ September 2017
- Yang Lou, Catalytic Light Olefin Upgrading Using Natural Gas for Gasoline Quality Improvement funded by MEG Energy and AIEES, January ~ December 2015
- Wenpo Shan, An Integrated Process to Simultaneously Convert Natural Gas and Low-Cost Biomass to Liquid Fuels funded by AIEES and NSERC, April 2014 ~ April 2015
- Cuijuan Zhang, Biomass pyrolysis under methane environment for upgraded oil production funded by AIEES, April ~ October 2013

IV. SCHOLARLY ACTIVITIES

A. Research Support (Total: $9,625,951 CAD + $1,655,000 USD)

i) Grants:

- "Mitigating GHG using low-cost natural resources valorization at ambient conditions", NSERC Discovery Grant, 5 years (April 1, 2025 ~ March 31, 2030) for $390,000 CAD (PI)
- "Machine Learning Assisted Optimization of Catalytic Chemical Process and its Applications in Low-cost Carbon Resources Valorization, NSERC Alliance Grant and AI Advance, 2 years (March 15, 2024 ~ March 14, 2026) for $180,000 CAD (PI)
- "Non-thermal Plasma Assisted Photocatalytic Conversion of Low-cost Light Hydrocarbons to Value-added Fuel and Chemicals at Ambient Conditions", NSERC Alliance Grant and Mitacs Accelerate, 2 years (September 1, 2022 ~ August 31, 2024) for $320,000 CAD (PI)
- "Plasma-assisted ammonia and value-added hydrocarbons productions from CH_4 and N_2", Mitacs Accelerate, 8 months for $30,000 CAD (PI)
- "Nonthermal Plasma Assisted Photocatalytic Air Purification and Sterilization at Ambient Conditions", NSERC Alliance Missions Grant, 2 years (April 1, 2022 ~ March 31, 2024) for $600,000 (PI)
- "Methane Assisted Catalytic Upgrading of Extra Heavy Crudes under Moderate Conditions", NSERC Alliance Grant, Mitacs Accelerate, and Alberta Innovates, 2 years (April 1, 2022 ~ July 31, 2024) for $410,000 (PI)

- "Catalytic Organic Solid Wastes Valorization Using Natural Gas", NSERC Alliance Grant, 2 years (April 1, 2022 ~ March 31, 2024) for $200,000 (PI)
- "Catalytic Valorization of Low-cost Light Crudes under Methane Environment", NSERC Alliance Grant, 2 years (July 15, 2021 ~ July 14, 2023) for $200,000 (PI)
- "Catalytic Valorization of Low-cost Light Crudes under Methane Environment", Alberta Innovates, 2 years (September 1, 2020 ~ August 31, 2022) for $100,000 (PI)
- "Multifunctional Catalyst Characterization System for Supporting Catalytic Natural Gas Valorization Program", NSERC RTI Grant, 1 year (April 1, 2021 ~ March 31, 2022) for $150,000 (PI)
- "Natural Gas Valorization", Guangxi Huarui Energy Technology Co. Ltd., 3 years (January 1, 2020 ~ December 31, 2022) for ￥2 million RMB (~$375,000 CAD) (PI)
- "Catalytic Organic Solid Wastes Upgrading Using Natural Gas for Valuable Commodities Production", Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant, 5 years (April 1, 2019 ~ March 31, 2024) for $165,000 (PI)
- "Flow Reactor System for a Comprehensive Research & Development Program in GHG Reduction Technologies", NSERC RTI Grant, 1 year (April 1, 2019 ~ March 31, 2020) for $125,556 (Co-PI)
- "Catalytic Heavy Oil Partial Upgrading under Natural Gas", NSERC CRD Grant, 2 years (January 23, 2019 ~ January 22, 2021) for $200,000 (PI)
- "Catalytic Heavy Oil Partial Upgrading under Natural Gas", Alberta Innovates, 2 years (March 1, 2019 ~ May 1, 2021) for $400,000 (PI)
- "Non-thermal Plasma Assisted Catalytic Bitumen Partial Upgrading under Methane Environment", NSERC CRD Grant, 2 years (October 1, 2017 ~ March 31, 2020) for $120,000 (PI)
- "Plasma Assisted Catalytic Bitumen Upgrading under Methane Environment", TelStar Group, 2 years (October 1, 2016 ~ September 30, 2018) for $100,000 (PI)
- Eyes High Doctoral Recruitment Scholarship Award, U of C, 5 years (September 1, 2016 ~ August 31, 2021) for $150,000 (PI)
- "Catalytic Heavy Crude Oil Upgrading Using Natural Gas", NSERC CRD Grant, 2 years (May 2, 2014 ~ May 1, 2016) for $80,000 (PI)
- "An Integrated Process to Simultaneously Convert Natural Gas and Low-Cost Biomass to Liquid Fuels", Alberta Innovates, 1.5 year (September 1, 2013 ~ April 15, 2015) for $65,000 (PI)
- "Determining heating Value of Selected Municipal Solid Wastes and Their Suitability for Producing High-Quality Biochar", AIEES, 1 year (January 1, 2013 ~ December 31, 2013) for $50,000 (Co-PI)
- "Catalytic Natural Gas Upgrading of Low-Cost Carbon Resources for Producing Valuable Commodities", NSERC Discovery Grant, 5 years (April 1, 2014 ~ March 31, 2019) for $100,000 (PI)
- "Partial Upgrading of Bitumen using Natural Gas", NSERC Engage Grant, 6 months (July 1, 2014 ~ December 31, 2014) for $25,000 (PI)
- "Forming collaboration with NORAM on natural gas partial upgrading of bitumen", NSERC Interaction Grant, 3 months (November 1, 2013 ~ January 31, 2014) for $2,072.00 (PI)
- "A Facility for Innovative Hydrocarbon Energy Research", Canada Foundation for Innovation – Leaders Opportunity Fund (CFI-LOF) and Alberta Innovation and Advanced Education through Small Equipment Grants Stream of the Alberta Capacity Program (RCP), $292,500 (PI)
- "Catalytic Light Olefin Upgrading Using Natural Gas for Gasoline Quality Improvement", Alberta Innovates, 3 years (October 1, 2013 ~ January 15, 2017) for $150,000 (PI)
- "Catalytic Simultaneous Conversion of CO_2 and Low-Cost Carbon Source into Valuable Liquid Commodities under Near Atmospheric Pressure", CPE New Faculty Research Award, 2 years (March 1, 2014 ~ September 30, 2016) for $50,000 (PI)
- "Catalytic Heavy Crude Oil Upgrading Using Natural Gas", University Seed Grant, 18 months (January 1, 2013 ~ July 1, 2014) for $18,000 (PI)

- "Near Atmospheric Pressure Catalytic Syngas to Liquid Fuels", University Starter Grant, 18 months (September 1, 2012 ~ February 28, 2013) for $5,000 (PI)
- University Research Grants Committee (URGC) Travel Grant, $1,800 (March, 2015)
- University Start-up Fund, U of C, 4 years (July 1, 2012 ~ June 30, 2016) for $100,000 (PI)
- "Conversion of CO_2 into Commercial Materials Using Carbon Feedstocks", 2011~2012, U.S. Department of Energy (DOE) through National Energy Technology Laboratory (NETL), Agreement No.: DE-FE0004329 (3 years, $1,000,000 USD project) (PI)

ii) Contracts:

- "Modeling and software development for crudes blending", Inter Pipeline, 1 year (September 1, 2024 ~ August 31, 2025) for $200,000 CAD (PI)
- "Advancement of CO_2 Sequestration Technology Using Minerals", Carbon Upcycling Technologies, 2 years (July 1, 2024 ~ June 30, 2026) for $100,000 CAD (PI)
- "Pilot-Scale Studies of Methane-Assisited Biomss Pyrolysis and Upgrading", Kara Technologies, 2 years (August 1, 2024 ~ July 31, 2026) for $100,000 CAD (PI)
- "Catalytic Synthesis of DME (Dimethyl Ether) from CO_2 and CH_4", Ethox Energy, 2 years (July 1, 2024 ~ June 30, 2026) for $150,000 CAD (PI)
- "Biocrudes Methanotreating", Kara Technologies, 2 years (July 1, 2024 ~ June 30, 2026) for $100,000 CAD (PI)
- "Plasma-assisted ammonia and value-added hydrocarbons productions from CH_4 and N_2", Carbon Upcycling Technologies, 8 months for $50,000 CAD (PI)
- "Pilot Demonstration of a Highly Integrated Organic Solid Wastes Valorization Process", Kara Technologies and Shell International, 2 years (April 1, 2023 ~ April 30, 2025) for $500,000 CAD (PI)
- "Non-thermal Plasma Assisted Photocatalytic Conversion of Low-cost Light Hydrocarbons to Value-added Fuel and Chemicals at Ambient Conditions", Carbon Upcycling Technologies, 2 years (September 1, 2022 ~ August 31, 2024) for $160,000 (PI)
- "Catalytic Upgrading of Extra Heavy Crude Using Natural Gas", Kara Technologies and Strathcona Resources, 2 years (January 1, 2022 ~ December 31, 2023) for $100,000 (PI)
- "Non-Thermal Plasma-Catalytic Dielectric Barrier Discharge Reactor for Water-Splitting", Carbon Upcycling Technologies, 3 month (February 5, 2021 ~ May 31, 2021) for $25,000 (PI)
- "Desulfurization on 2 Cielo Samples", Cielo Waste Solutions, 2 month (October 1, 2020 ~ December 31, 2020) for $20,000 (PI)
- "Catalytic Biomass Valorization Using Natural Gas", Kara Technologies, 2 years (September 1, 2020 ~ August 31, 2022) for $200,000 (PI)
- "Catalytic Targeted Upgrading of Extra Heavy Crude under Natural Gas", Kara Technologies, 2 years (September 1, 2020 ~ August 31, 2022) for $50,000 (PI)
- "Catalytic Valorization of Low-cost Light Crudes under Methane Environment", Kara Technologies, 2 years (June 30, 2020 ~ September 30, 2022) for $100,000 (PI)
- "Catalytic Heavy Oil Upgrading for Pipeline Transportation", Kara Technologies, 5 years (August 1, 2017 ~ May 1, 2021) for $757,500 (PI)
- "Non-thermal plasma assisted catalytic bitumen partial upgrading under methane environment", Institute for Oil Sands Innovation at University of Alberta, 2 years (October 1, 2017 ~ March 31, 2020) for $120,000 (PI)
- "Catalytic Valorization of Crude Oil for Chemical Production", Guangxi Sino-Green Energy and Environmental Technologies, 1.5 years (April 1, 2018 ~ December 31, 2019) for $150,000 (PI)
- "Aromatics Production from Petrochemical Intermediates under Methane", Shandong Chambroad Petrochemicals, 2 years (August 1, 2016 ~ July 31, 2018) for RMB ￥1,200,000 (approximately CAD $232,560) (PI)

- "Catalytic Bitumen Upgrading under Methane Environment", TelStar Group, 2 years (September 1, 2016 ~ August 31, 2018) for $60,000 (PI)
- "Direct Olefin Reduction", MEG Energy, 1.5 years (August 1, 2017 ~ January 31, 2019) for $120,000 (PI)
- "Partial Upgrading of Bitumen using Natural Gas", BC Research, 3 years (March 1, 2014 ~ February 28, 2017) for $105,000 (PI)
- "Methane Upgrading of Bitumen", Imperial Oil, 2 years (May 2, 2014 ~ May 1, 2016) for $100,000 (PI)
- "Catalytic Light Olefin Upgrading Using Natural Gas for Gasoline Quality Improvement", MEG Energy, 3 years (October 1, 2013 ~ January 15, 2017) for $150,000 (PI)
- "Low Temperature Catalytic NO_x Control in the Flue Gas", 2010~2011, 1 year $100,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD1007 (PI)
- "Low Temperature Catalytic Coal/Biomass Gasification at Atmospheric Pressure", 2010-2011, 1 year $110,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD1006 (PI)
- "HMI CO_2 Solid Sorbents Development", 2009~2011, 2-year $125,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD9002 (PI)
- "Ammonia Less NO_x Control", 2009~2011, 2-year $200,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD8002 (PI)
- "Selective Catalytic Oxidation of Ammonia", 2009~2010, 1 year $120,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD7004 (PI)

B. Invited Keynote Addresses:

- Alagumalai, A., Song, H.*, "Machine learning assisted process to accelerate sustainable energy and chemical production", 2024 Canadian Chemical Engineering Conference, Toronto, ON, October 2024
- Song, H.*, "Non-thermal Plasma Assisted Low-cost Resources Valorization under Methane", ACS Fall 2024 National Meeting, Denver, CO, August 2024
- Song, H.*, "Methane assisted catalytic biomass valorization", ACS Spring 2024 National Meeting, New Orleans, LA, March 2024
- Song, H.*, "Methane assisted catalytic biomass valorization", ACS Spring 2023 National Meeting, Indianapolis, IN, March 2023
- Song, H.*, "Non-thermal Plasma Assisted Photocatalytic Valorization of Low-cost Carbon Resources", "Engineering" Lecture Hall, Beijing, China, April 2022
- Song, H.*, "Catalytic upgrading of biomass and its model compounds under methane environment", 7th International Conference on Biomass Energy, Xiamen, China, April 2022
- Song, H.*, "Advanced Production of Renewable Fuel and Chemicals", China-Canada Bioenergy Network March Webinar, March 2022
- Song, H.*, Meng, S., Wang, A., He, P., "Catalytic Methane Valorization at Mild Conditions through Coupling Effect", 69th Canadian Chemical Engineering Conference, Halifax, NS, October 2019
- Song, H.*, He, P., Jarvis, J., Kou, S., "Co-aromatization of methane with olefins: The role of catalytic sites in the inner pores and on the external surface of metal modified zeolites", 254th ACS National meeting, Washington D.C., August 2017
- Song, H.*, He, P., Lyu, X., Shi, H., "Catalytic Low-Cost Carbon Resources Pyrolysis under Natural Gas for Upgraded Oil Production", 247th ACS National meeting & exposition, Dallas, TX, March 2014
- Song, H., Ozkan, U.S., "Catalytic Hydrogen Production from Bio-renewable Resources", 2nd international Symposium on Bioenergy and Bioprocess Technology, Qingdao, P.R. China, October 2008

C. Publications:

i) Peer-reviewed journal papers (As first author or corresponding author; total citation: ~**9,000**; H-Index: **50**; I10 Index: **203**):

[1] Rai, S., Kim, M., Song, H.*, "Algae to biofuels: Catalytic strategies and sustainable technologies for green energy conversion", Catalysts, (***Submitted***) Impact Factor: *4.0 (Q2)* ***Invited***

[2] Narimani, A., Liu, X., Song, H.*, "Machine learning for optimizing the electrocatalytic conversion of methane to methanol and ethanol under ambient conditions", Catalysis Science & Technology, (***Submitted***) Impact Factor: *4.4 (Q2)*

[3] Liu, A., Song, H.*, "Agentic AI Framework for Predictive Catalyst Design in Biomass Valorization", Cell Reports Physical Science, (***Under review***) Impact Factor: *7.9 (Q1)*

[4] Narimani, A., Song, H.*, "Electrocatalytic Methane Conversion to Value-Added Chemicals Using Pt-Co/TiO_2/g-C_3N_4 Nanohybrids Under Solar Light", Fuel, (***Under review***) Impact Factor: *6.7 (Q1)*

[5] Liu, Y., Omidkar, A., Song, X., Song, H.*, Du, K.*, "Construction of Three-Dimensional-Structured SnO/g-C_3N_4 Nanocomposites for NO_2 Detection at Low Working Temperature", Sensors and Actuators B: Chemical, (***Under review***) Impact Factor: *8.0 (Q1)*

[6] Omidkar, A., Es'haghian, R., Nguyen, H., Salmasi, M., Li, Z., Song, H.*, "Developing Smart Non-thermal Plasma Catalytic Refinery for Upgrading Bio-crudes under Methane: Mechanistic Investigation and Sustainability Assessment", ACS Catalysis, (***Under review***) Impact Factor: ***11.7 (Q1)***

[7] Liu, A., Liu, Y., Li, W., Li, Z., Song, H.*, "Machine-learning enabled non-catalytic plasma driven route to toluene degradation and environmental impact assessment studies", Journal of Environmental Chemical Engineering, (***Accepted with revision***) Impact Factor: *7.4 (Q1)*

[8] Liu, Y., Li, W., Omidkar, A., Li, Z., Song, H.*, "Toluene degradation by non-thermal plasma with Pt-TiO_2 catalysts: Size effect of Pt nanoparticles", Journal of Environmental Chemical Engineering, (***Accepted with revision***) Impact Factor: *7.4 (Q1)*

[9] Omidkar, A., Es'haghian, R., Song, H.*, "Developing a Machine Learning Framework for Equitable Pricing in Biomass Transportation from Farms to Biorefineries", Cleaner Logistics and Supply Chain, (***Accepted with revision***) Impact Factor: *5.2 (Q2)* ***Invited***

[10] Omidkar, A., Alagumalai, A., Vimai, KEK, Zheng, Y., Song, H.*, "Overcoming barriers to upscale renewable diesel production", Nature Reviews Clean Technology", Nature Reviews Clean Technology, (***Accepted with revision***) ***Invited***

[11] Kim, G., Liu, A., Jarvis, J., Bonetti, E., Li, Z., Song, H.*, "Machine Learning Assisted Bio-oil Deoxygenation under Methane Environment: The Model Compound Study on Guaiacol", Catalysis Today, (**2025**), 459, 115428 Impact Factor: *5.2 (Q1)* ***Invited***

[12] Salmasi, M., Omidkar, A., Ying, H., Song, H.*, "Enhanced Phenol Degradation in Wastewater Using Non-Thermal Plasma Coupled with NiO/g-C_3N_4 Nanocomposite Catalyst", Journal of Environmental Chemical Engineering, (**2025**), 13(4), 117180, Impact Factor: *7.4 (Q1)*

[13] Faizan, M., Saeed, R., Aamir, E., Kiong, T., Song, H.*, "Ion Transport Mechanism in Sodium-Ion Batteries: Fundamentals, Applications, and Future Trends, Journal of Energy Storage, (**2025**), 122, 116616, Impact Factor: *8.9 (Q1)*

[14] Salmasi, M., Es'haghian, R., Omidkar, A., Song, H.*, "Non-Thermal Plasma-Catalytic Conversion of Biogas to Value-Added Liquid Chemicals via Ni-Fe/Al_2O_3 Catalyst", Applied Sciences, (**2025**), 15(8), 4248, Impact Factor: *2.5 (Q2)* ***Invited***

[15] Liu, Y., Li, Z., Song, H.*, "Nonthermal Plasma Integrated with Catalysts for Nitrogen Fixation from Nitrogen and Water", Catalysis Science & Technology, (**2025**) 15, 2016-2026 Impact Factor: *4.4 (Q2)*

[16] Omidkar, A. Es'haghian, R., Song, H.*, "Using Machine Learning methods for Long-term Technical and Economic Evaluation of wind power plants", Green Energy and Resources, (**2025**) 3(1), 100115 ***Invited***

[17] Faizan, M., Bibi, H., Aamir, E., Saeed, R., Kiong, T., Song, H.*, "Advancements in Chromium-Based Transition Metal Nitrides: Electrochemical Catalysts for Sustainable Energy Solutions and Environmental Mitigation", Renewable and Sustainable Energy Reviews, (**2025**) 212, 115385 Impact Factor: ***15.9 (Q1)***

[18] Omidkar, A., Alagumalai, A., Es'haghian, R., Song, H.*, "Economic Viable Renewable Diesel by Organic Solid Waste Upgrading Using Natural Gas", Chem, (**2025**) 11, 102389 Impact Factor: ***19.1 (Q1) Invited***

[19] Omidkar, A., Es'haghian, R., Song, H.*, "Developing a Machine Learning Model for Fast Economic Optimization of Solar Power Plants using the Hybrid Method of Firefly and Genetic Algorithms, Case Study: Optimizing Solar Thermal Collector in Calgary, Alberta", Green Finance, (**2024**) 6(4), 698-727 Impact Factor: *5.5 (Q1)* ***Invited***

[20] Li, Z., Omidkar, A. Song, H.*, "Pilot-Scale Study of Methane Assisted Catalytic Bitumen Partial Upgrading", Fuel Processing Technology, (**2024**) 264, 108138 Impact Factor: *7.5 (Q1)*

[21] Li, Z., Song, H.*, "Catalytic Valorization of organic solid waste: a pilot-scale run of sugarcane bagasse", Catalysts, (**2024**) 14(9), 568 Impact Factor: *3.8 (Q3)* ***Invited***

[22] Alagumalai, A., Song, H.*, "Exploring the landscape of machine learning-aided research in biofuels and biodiesel: a bibliometric analysis", Green Energy and Resources, (**2024**) 2(3), 100089 ***Invited***

[23] Faizan, M., Aamir, E., Kiong, T., Song, H.*, "Study of the Structure Activity Relationship for n-Butane Selective Oxidation towards Maleic Anhydride", Catalysis Science & Technology, (**2024**) 14, 2972 Impact Factor: *5.0 (Q2)*

[24] Li, W., Alagumalai, A., Li, Z., Song, H.*, "Investigation on non-thermal plasma technology for air pollution control and bacterial deactivation", Cell Reports Physical Science, (**2024**) 5(7), 102092 Impact Factor: *8.9 (Q1)*

[25] Shimizu, K., Ueda, W., Song, H., "Introduction to integrated approaches for methane activation", Catalysis Science & Technology, (**2024**), 14, 2972 Impact Factor: *5.0 (Q2)*

[26] Omidkar, A., Haddadian, K., Es'haghian, R., Alagumalai, A., Li, Z., Song, H.*, "Novel energy efficient in-situ bitumen upgrading technology to facilitate pipeline transportation using natural gas: sustainability evaluation using a new hybrid approach based on fuzzy multi-criteria decision-making tool and techno-economic and life cycle assessment", Energy, (**2024**), 297, 131280 Impact Factor: *9 (Q1)*

[27] Kaur, M., Alagumalai, A., Sadri, R., Tandon, S., Roberts, E., Song, H.*, "Solar-powered plasmon-boosted graphene towards enhanced ammonia production", Journal of Materials Chemistry A, (**2024**), 12, 9637-9650 Impact Factor: ***11.9 (Q1)***

[28] Jarvis, J., Li, Z., Wang, Z., Liu, L., Chang, L., Alagumalai, A., Song, H.*, "Inhibiting Platinum Sintering in Direct Ethane Dehydrogenation and Nonoxidative Methane Activation Reactions by Sequential Sulfide Layered Chemical Vapor Deposition", Chemical Engineering Journal, (**2024**), 488, 151080 Impact Factor: ***15.1 (Q1)***

[29] Kaur, M., Sadri, R., Alagumalai, A., Cao, Y., Osman, S., Roberts, E., Naguib, M., Song, H.*, "Boosting Alcohol Production via Nitrogen-Doped Electrochemically Exfoliated Graphene and Layered Ti_3CN MXene Hybrid Photo-Electrocatalyst", Chemical Engineering Journal, (**2024**), 483, 149261 Impact Factor: ***15.1 (Q1)***

[30] Salmasi, M., Omidkar, A., Nguyen, H., Song, H.*, "MXenes as Electrocatalysts for Hydrogen Production through the Electrocatalytic Water Splitting Process: A Mini Review", Energy Reviews, (**2024**), 3(3), 100070 ***Invited***

[31] Nguyen, H., Omidkar, A., Li, W., Li, Z., Song, H.*, "Non-thermal Plasma Catalysis Driven Sustainable Pyrolysis Oil Upgrading to Jet Fuel at Near Ambient Conditions", EES Catalysis, (**2024**), 2, 647-663 ***Invited***

[32] Alagumalai, A., Wang, C., Han, J., Lichtfouse, E., Song, H.*, "Ozone poisoning in research laboratories and in the industry", Environmental Chemistry Letters, (**2024**), *DOI: 10.1007/s10311-023-01676-1* Impact Factor: ***11.2 (Q1)***

[33] Nguyen, H., Salmasi, M., Song, H.*, "In-Liquid Plasma Catalysis: Tools for Sustainable H_2-free Heavy Oils Upgrading", ChemistrySelect, (**2024**), 9 (3), e202304920 Impact Factor: *2.1* ***Invited***

[34] Omidkar, A., Alagumalai, A., Li, Z., Song, H.*, "Machine learning assisted techno-economic and life cycle assessment of organic solid waste upgrading under natural gas", Applied Energy, (**2024**), 355, 122321 Impact Factor: ***11.2 (Q1)***

[35] Alagumalai, A., Song, H.*, "Methanotreating: A sustainable pathway to clean fuels and chemicals", Biofuel Research Journal, (**2023**), 10 (4), 1966-1973 Impact Factor: ***13.0 (Q1)***

[36] Alagumalai, A., Song, H.*, "A sustainable pathway towards hydrogen-free biorefineries", The Innovation Materials, (**2023**), 1, 100039 ***Invited***

[37] Jarvis, J., Xu, H., Li, Y., Li, Z., Li, W., Meng, S., Chang, L.Y., Liu, L., Song, H.*, "Methane-assisted Selective Bio-oil Deoxygenation for High-Quality Renewable Fuel Production: A Rational Catalyst Design and Mechanistic Study", Chemical Engineering Journal, (**2023**), 475, 146052 Impact Factor: ***15.1 (Q1)***

[38] Kaur, M., Faizan, M., Song, H.*, "Plasmonic Titanium Nitride based Ammonia Synthesis by Photo-electrocatalytic Reduction of Nitrogen", Chemical Engineering Journal, (**2023**), 474, 145963 Impact Factor: ***15.1 (Q1)***

[39] Liu, Y., Li, S., Meng, S., Xiao, S., Song, H.*, Du, K., "Defects-enriched 2D ultrathin g-C_3N_4/In_2O_3 nanoparticles for superior NO_2 gas-sensing performance at room temperature", Sensors and Actuators B: Chemical, (**2023**), 396, 134558 Impact Factor: *8.4 (Q1)*

[40] Alagumalai, A., Devarajan, B., Song, H.*, "Unlocking the potential of catalysts in thermochemical energy conversion processes", Catalysis Science & Technology, (**2023**), 13, 5632, Impact Factor: *5.0*

[41] Meng, S., Li, W., Li, Z., Song, H.*, "Non-thermal Plasma Assisted Non-oxidative Methane Liquefaction for Fuel Production at Near Ambient Conditions", Catalysis Science & Technology, (**2023**), 13, 4665, Impact Factor: *5.0 (Q2)*

[42] Nguyen, H., Omidkar, A., Li, W., Meng, S., Li, Z., Song, H.*, "Non-thermal Plasma Assisted Catalytic Nitrogen Fixation with Methane at Ambient Conditions", Chemical Engineering Journal, (**2023**), 471, 144748, Impact Factor: ***15.1 (Q1)***

[43] Meng, S., Li, W., Li, Z., Song, H.*, "Recent Progress of the Transition Metal-based Catalysts in the Catalytic Biomass Gasification: A Mini-Review", Fuel, (**2023**), 353, 129169, Impact Factor: *7.4 (Q1)*

[44] Mahian, O., Alagumalai, A., Devarajan, B., Song, H.*, Wongwises, S., Ledesma-Amaro, R., Sheremet, M., Lichtfouse E., "Machine learning in biohydrogen production: A review", Biofuel Research Journal (**2023**), 10(2), 1844, Impact Factor: ***13.0 (Q1) Invited***

[45] Omidkar, A., Xu, H., Li, Z., Haddadian, K., Song, H.*, "Techno-economic and life cycle assessment of renewable diesel production via methane-assisted catalytic waste cooking oil upgrading", Journal of Cleaner Production, (**2023**), 414, 137512 Impact Factor: ***11.1 (Q1)***

[46] Nguyen, H., Omidkar, A., Song, H.*, "Technical challenges and prospects in sustainable catalytic ammonia production", ChemPlusChem (**2023**), 88 (7), 1-11, Impact Factor: *3.4,* ***Invited***

[47] Priya, A. K., Devarajan, B., Alagumalai, A., Song, H.*, "Bio-based agricultural products: a sustainable alternative to agrochemicals for promoting a circular economy", RSC Sustainability (**2023**), 1, 746-762, ***Invited***

[48] Priya, A. K., Devarajan, B., Alagumalai, A., Song, H.*, "Artificial intelligence enabled carbon capture: A review", Science of The Total Environment, (**2023**), 886, 163913 Impact Factor: *9.8 (Q1)*

[49] Faizan, M., Song, H.*, "Critical review on catalytic biomass gasification: State-of-Art progress, technical challenges, and perspectives in future development", Journal of Cleaner Production, (**2023**), 408, 137224, Impact Factor: ***11.1 (Q1)***

[50] Kaur, M., Li, Z., Meng, S., Li, W., Song, H.*, "Electrocatalytic Methane Conversion to High Value Chemicals at Ambient Conditions", Energy Conversion and Management, (**2023**), 285, 117029, Impact Factor: ***11.533 (Q1)***

[51] Xu, H., Haddadian, K., Li, Y., Li, Z., Li, W., Jarvis, J., Song, H.*, "Methane-assisted Catalytic Light Oil Desulfurization: Catalyst Design, Sulfur Product Distribution Analysis and Mechanistic Study", Chemical Engineering Journal, (**2023**), 464, 142648, Impact Factor: ***15.1 (Q1)***

[52] Li, W., Cao, M., Meng, S., Li, Z., Xu, H., Liu, L., Song, H.*, "Non-Thermal Plasma Assisted Catalytic Hydrogen Production via Water Splitting at Near Ambient Conditions", Journal of Cleaner Production, (**2023**), 387, 135913, Impact Factor: ***11.1 (Q1)***

[53] Xu, H., Cao, M., Li, Z., Li, W., Meng, S., Song, H.*, "Production of Low Carbon Number Olefins from Natural Gas: Methane-involved Catalytic Non-Oxidative Propane Dehydrogenation", Chemical Engineering Journal, (**2023**), 454, 140508, Impact Factor: ***15.1 (Q1)***

[54] Jarvis, J., Li, Z., Meng, S., Song, H.*, "Methane Assisted Catalyst Synthesis and Catalytic Conversion of Fatty Acids", Journal of Materials Chemistry A, (**2022**), 10, 18671-18678, Impact Factor: ***11.9 (Q1)***

[55] Meng, S., Li, W., Li, Z., Song, H.*, "Non-thermal plasma assisted catalytic thiophene removal from fuel under different atmospheres", Journal of Cleaner Production, (**2022**), 369, 133282, Impact Factor: ***11.1 (Q1)***

[56] Xu, H., Li, Y., Meng, S., Liu, L., Song, H.*, "Catalytic elemental sulfur-assisted methane activation at low temperature", Applied Catalysis B: Environmental, (**2022**), 315, 121518, Impact Factor: ***22.1 (Q1)***

[57] Xu, H., He, P., Li, Z., Meng, S., Li, Y., Chang, L., Liu, L., Wen, X., Klein, B., Michaelis, V., Qi, J., Wu, D., Liu, X., Song, H.*, "Environmentally benign methane-regulated catalytic desulfurization", Applied Catalysis B: Environmental, (**2022**), 312, 121436, Impact Factor: ***22.1 (Q1)***

[58] Xu, H., Song, Y., Zhang, Y., Song, H.*, "Organic solid waste upgrading under natural gas for valuable liquid products formation: Pilot demonstration of a highly integrated catalytic process", Bioresource Technology (**2022**), 346, 126645, Impact Factor: ***11.4 (Q1)***

[59] Xu, H., Li, Y., Li, Z., Song, Y., Zhang, Y., Song, H.*, "Methane-assisted waste cooking oil conversion for renewable fuel production", Fuel (**2022**), 311, 122613, Impact Factor: *7.4 (Q1)*

[60] Li, Y., Xu, H., Li, Z., Meng, S., Song, H.*, "Catalytic methanotreating of vegetable oil: A pathway to Second-generation biodiesel", Fuel (**2022**), 311, 122504, Impact Factor: *7.4 (Q1)*

[61] Xu, H., Li, Z., Li, Y., Song, H.*, "The interactive role of methane beyond a reactant in crude oil upgrading", Nature Communications Chemistry, (**2021**), 4, 152, Impact Factor: *5.9 (Q2)*

[62] Li, W., Meng, S., Li, Z., Song, H.*, "The function of porous working electrodes for hydrogen production from water splitting in non-thermal plasma reactor", Fuel (**2022**), 310, 122156, Impact Factor: *7.4 (Q1)*

[63] Xu, H., Song, Y., Zhang, Y., Song, H.*, "Catalytic vacuum residue upgrading under methane: Evaluation of process feasibility, stability and versatility", Fuel, (**2022**), 309, 122155, Impact Factor: *7.4 (Q1)*

[64] Meng, S., Li, W., Xu, H., Li, Z., Li, Y., Jarvis, J., Song, H.*, "Non-thermal plasma assisted catalytic reforming of naphtha and its model compounds with methane at near ambient conditions", Applied Catalysis B: Environmental, (**2021**), 297, 120459, Impact Factor: ***22.1 (Q1)***

[65] Li, Z., Li, Y., Xu, H., Jarvis, J., Meng, S., Song, H.*, "Effect of methane presence on catalytic heavy oil partial upgrading", Fuel (**2021**), 297, 120733, Impact Factor: *7.4 (Q1)*

[66] Xu, H., Li, Z., Meng, S., Jarvis, J., Song, H.*, "Highly selective skeletal isomerization of cyclohexene over zeolite-based catalysts for high-purity methylcyclopentene production", Nature Communications Chemistry (**2021**), 4, 34, Impact Factor: *5.9 (Q2)*

[67] Xu, H., Li, Z., Li, Y., Song, H.*, "Catalytic asphaltene upgrading under methane environment: Solvent effect and its interaction with oil components", Fuel (**2021**), 291, 120157, Impact Factor: *7.4 (Q1)*

[68] Li, Y., He, P., Li, Z., Xu, H., Jarvis, J., Meng, S., Song, H.*, "Catalytic desulfurization of marine gas oil and marine diesel oil under methane environment", Fuel (**2021**), 289, 119864, Impact Factor: *7.4 (Q1)*

[69] Jarvis, J., Harrhy, J., Wang, A., Bere T., Morgan, D., Carter, J., Howe, A., He, Q., Hutchings, G., Song, H.*, "Inhibiting the Dealkylation of Basic Arenes during n-Alkane Direct Aromatization Reactions and Understanding the C_6 Ring Closure Mechanism", ACS Catalysis (**2020**), 10, 8428-8443, Impact Factor: ***12.9 (Q1)***

[70] He, P., Chen, Y., Jarvis, J., Meng, S., Liu, L., Wen, X., Song, H.*, "Highly Selective Aromatization of Octane over Pt–Zn/UZSM-5: The Effect of Pt–Zn Interaction and Pt Position", ACS Applied Materials & Interfaces (**2020**), 12(25), 28273-28287, Impact Factor: *9.5 (Q1)*

[71] Xu, H., Li, Z., Pryde, R., Meng. S., Li, Y., Song, H.*, "Participation of methane in an economically and environmentally favorable catalytic asphaltene upgrading process", Chemical Communications (**2020**), 56, 5492-5495, Impact Factor: *4.9 (Q2)*

[72] Wang, A., Meng, S., Song, H.*, "Non-thermal plasma induced photocatalytic conversion of light alkanes into high value-added liquid chemicals under near ambient conditions", Chemical Communications (**2020**), 56, 5263-5266, Impact Factor: *4.9 (Q2)*

[73] Meng, S., Wang, A., He, P., Song, H.*, "Nonthermal Plasma-Assisted Photocatalytic Conversion of Simulated Natural Gas for High-Quality Gasoline Production near Ambient Conditions", Journal of Physical Chemistry Letters (**2020**), 11, 3877-3881, Impact Factor: *5.7* (*Q2*)

[74] Peng, H., Wang, A., He, P., Meng, S., Song, H.*, "One-pot direct conversion of bamboo to aromatics under

methane", Fuel (**2020**), 267, 117196, Impact Factor: *7.4 (Q1)*

[75] He, P., Meng, S., Song, Y., Liu, B., Song, H.*, "Heavy Oil Catalytic Upgrading under Methane Environment: A Small Pilot Plant Evaluation", Fuel, (**2019**), 258, 116161, Impact Factor: *7.4 (Q1)*

[76] Peng, H., Wang, A., He, P., Harrhy, J., Meng, S., Song, H.*, "Solvent-free catalytic conversion of xylose with methane to aromatics over Zn-Cr modified zeolite catalyst", Fuel, (**2019**), 253, 988-996, Impact Factor: *7.4 (Q1)*

[77] Sun, X., He, P., Gao, Z., Liao, Y., Weng, S., Zhao, Z., Song, H.*, Zhao, Z.*, "Multi-crystalline N-doped Cu/CuxO/C foam catalyst derived from alkaline N-coordinated HKUST-1/CMC for enhanced 4-nitrophenol reduction", Journal of Colloid and Interface Science, (**2019**), 553, 1-13, Impact Factor: *9.9 (Q1)*

[78] Wang, A., Austin, D. Song, H.*, "Catalytic Upgrading of Biomass and its Model Compounds for Fuel Production", Current Organic Chemistry, (**2019**), 23(5), 517-529, Impact Factor: *2.6 (Invited)*

[79] Wang, A., Harrhy, J., Meng, S., He, P., Liu, L., Song, H.*, "Nonthermal plasma-catalytic conversion of biogas to liquid chemicals with low coke formation", Energy Conversion and Management, (**2019**), 191, 93-101, Impact Factor: ***11.533 (Q1)***

[80] Harrhy, J., Wang, A., Jarvis, J., He, P., Meng, S., Yung, M., Liu, L., Song, H.*, "Understanding zeolite deactivation by sulfur poisoning during direct olefin upgrading", Nature Communications Chemistry, (**2019**), 2, 37, Impact Factor: *5.9 (Q2)*

[81] Jarvis, J., Harrhy, J., He, P., Wang, A., Liu, L., Song, H.*, "Highly selective aromatization and isomerization of n-alkanes from bimetallic Pt–Zn nanoparticles supported on a uniform aluminosilicate", Chemical Communications, (**2019**), 55, 3355-3358, Impact Factor: *4.9 (Q2)*

[82] He, P., Jarvis, J., Meng, S., Li, Q., Bernard, G., Liu, L., Mao, X., Jiang, Z., Zeng, H., Michaelis, V., Song, H.*, "Co-aromatization of methane with propane over Zn/HZSM-5: The methane reaction pathway and the effect of Zn distribution", Applied Catalysis B: Environmental, (**2019**), 250, 99-111 Impact Factor: ***22.1 (Q1)***

[83] Wang, A., Austin, D., Song, H.*, "Investigations of thermochemical upgrading of biomass and its model compounds: Opportunities for methane utilization", Fuel, (**2019**), 246, 443-453 Impact Factor: *7.4 (Q1)*

[84] Shen, Z., He, P., Wang, A., Harrhy, J., Meng, S., Peng, H., Song, H.*, "Conversion of naphthalene as model compound of polyaromatics to mono-aromatic hydrocarbons under the mixed hydrogen and methane atmosphere ", Fuel, (**2019**), 243, 469-477 Impact Factor: *7.4 (Q1)*

[85] Wang, A., Austin, D., He, P., Ha, M., Bernard, G., Michaelis, V., Liu, L., Qian, H., Zeng, H., Song, H.*, "Mechanistic Investigation on Catalytic Deoxygenation of Phenol as a Model Compound of Biocrude Under Methane", ACS Sustainable Chemistry & Engineering, (**2019**), 7 (1), 1512-1523, Impact Factor: *8.4 (Q1)*

[86] He, P., Jarvis, J., Liu, L., Song, H.*, "The promoting effect of Pt on the co-aromatization of pentane with methane and propane over Zn-Pt/HZSM-5", Fuel, (**2019**), 239, 946-954, Impact Factor: *7.4 (Q1)*

[87] Shen, Z., Ke, M., Lan, L., He, P., Liang, S., Zhang, J., Song, H.*, "Active phases and reaction performance of Mo improved Ni/Al_2O_3 catalysts for thioetherification", Fuel, (**2019**), 236, 525-534, Impact Factor: *7.4 (Q1)*

[88] Jarvis, J., He, P., Wang, A., Song, H.*, "Pt-Zn/HZSM-5 as a highly selective catalyst for the Co-aromatization of methane and light straight run naphtha", Fuel, (**2019)**, 236, 1301-1310, Impact Factor: *7.4 (Q1)*

[89] He, P., Wang, A., Meng, S., Bernard, G., Liu, L., Michaelis, V., Song, H.*, "Impact of Al sites on the methane co-aromatization with alkanes over Zn/HZSM-5", Catalysis Today, (**2019**), 323, 94-104, Impact Factor: *6.562 (Q1)*

[90] Wang, A., Austin, D., He, P., Mao, X., Zeng, H., Song, H.*, "Direct catalytic co-conversion of cellulose and methane to renewable petrochemicals", Catalysis Science & Technology, (**2018)**, 8, 5632-5645, Impact Factor: *5.0*

[91] Austin, D., Wang, A., Harrhy, J., Mao, X., Zeng, H., Song, H.*, "Catalytic aromatization of acetone as a model compound for biomass-derived oil under a methane environment", Catalysis Science & Technology, (**2018)**, 8, 5104-5114, Impact Factor: *5.0*

[92] Wang, A.; Song, H.*, "Maximizing the production of aromatic hydrocarbons from lignin conversion by

coupling methane activation", Bioresource Technology, (**2018**) 268, 505-513, Impact Factor: ***11.4 (Q1)***

[93] Wang, A., Austin, D., Qian, H., Zeng, H., Song, H.*, "Catalytic Valorization of Furfural under Methane Environment", ACS Sustainable Chemistry & Engineering, (**2018**), 6(7), 8891-8903, Impact Factor: *8.4 (Q1)*

[94] Li, Q., He, P., Jarvis, J., Bhattacharya, A., Mao, X., Wang, A., Bernard, G., Michaelis, V., Zeng, H., Liu, L., Song, H.*, "Catalytic co-aromatization of methane and heptane as an alkane model compound over Zn-Ga/ZSM-5: A mechanistic study", Applied Catalysis B: Environmental, (**2018**), 236, 13-24, Impact Factor: ***22.1 (Q1)***

[95] He, P., Jarvis, J. Meng, S., Wang, A., Kou, S., Gatip, R., Yung, M., Liu, L., Song, H.*, "Co-Aromatization of methane with Olefin: The Role of Inner Pore and External Surface Catalytic Sites", Applied Catalysis B: Environmental, (**2018**), 234, 234-246, Impact Factor: ***22.1 (Q1)***

[96] Jarvis, J., Wong, A., He, P., Li, Q., Song, H.*, "Catalytic aromatization of naphtha under methane environment: Effect of surface acidity and metal modification of HZSM-5", Fuel, (**2018**), 223, 211-221, Impact Factor: *7.4 (Q1)*

[97] Li, Q., Zhang, F., Jarvis, J., He, P., Yung, M., Wang, A., Zhao, K., Song, H.*, "Investigation on the light alkanes aromatization over Zn and Ga modified HZSM-5 catalysts in the presence of methane", Fuel, (**2018**), 219, 331-339, Impact Factor: *7.4 (Q1)*

[98] Austin, D., Wang, A., He, P., Qian, H., Zeng, H., Song, H.*, "Catalytic valorization of biomass derived glycerol under methane: Effect of catalyst synthesis method", Fuel, (**2018**), 216, 218-226, Impact Factor: *7.4 (Q1)*

[99] Wang, A., Austin, D., Karmakar, A., Bernard, G., Michaelis, V., Yung, M., Zeng, H., Song, H.*, "Methane Upgrading of Acetic Acid as a Model Compound for a Biomass-Derived Liquid over a Modified Zeolite Catalyst", ACS Catalysis, (**2017**), 7(5), 3681-3692, Impact Factor: ***12.9 (Q1)***

[100] He, P., Gatip, R., Yung, M., Zeng, H., Song, H.*, "Co-Aromatization of Olefin and Methane over Ag-Ga/ZSM-5 Catalyst at Low Temperature", Applied Catalysis B: Environmental, (**2017**) 211, 275-288, Impact Factor: ***22.1 (Q1)***

[101] He, P., Wen, Y., Jarvis, J., Gatip, R., Austin, D., Lou, Y., Song, H.*, "Selective Participation of Methane in Olefin Upgrading over Pd/ZSM-5 and Ir/ZSM-5: Investigation using Deuterium Enriched Methane", ChemistrySelect, (**2017**) 2, 252-256, Impact factor: *2.1*

[102] He, P., Luan, Y., Zhao, L., Cheng, W., Wu, C., Chen, S., Song, H.*, "Catalytic Bitumen Partial Upgrading over Ag-Ga/ZSM-5 under Methane Environment", Fuel Processing Technology, (**2017**) 156, 290-297, Impact factor: *7.5 (Q1)*

[103] He, P., Zhao, L., Song, H.*, "Bitumen partial upgrading over Mo/ZSM-5 under methane environment: Methane participation investigation", Applied Catalysis B: Environmental, (**2017**) 201, 438-450, Impact factor: ***22.1 (Q1)***

[104] Lou, Y., He, P., Zhao, L., Cheng, W., Song, H.*, "Olefin Upgrading over Ir/ZSM-5 catalysts under Methane Environment", *Applied Catalysis B: Environmental*, (**2017**) 201, 278-289, Impact Factor: ***22.1 (Q1)***

[105] Zhao, L., He, P., Jarvis, J., Song, H.*, "Catalytic Bitumen Partial Upgrading under Methane Environment over Ag-Mo-Ce/ZSM-5 Catalyst and Mechanistic Study Using N-Butylbenzene as Model Compound", Energy & Fuels, (**2016**) 30 (12), 10330-10340, Impact Factor: *5.3 (Q2)*

[106] Lou, Y., He, P., Zhao, L., Song, H.*, "Highly Selective Olefin Hydrogenation: Refinery Oil Upgrading over bifunctional Pd/H-ZSM-5", Catalysis Communications, (**2016**) 87, 66-69, Impact Factor: *3.7*

[107] Lou, Y., He, P., Zhao, L., Song, H.*, "Refinery oil upgrading under methane environment over PdOx/H-ZSM-5: Highly selective olefin cyclization", *Fuel*, (**2016**) 183, 396-404, Impact Factor: *7.4 (Q1)*

[108] Wang, A., He, P., Yung, M., Zeng, H., Qian, H., Song, H.*, "Catalytic Co-Aromatization of Ethanol and Methane", *Applied Catalysis B: Environmental*, (**2016**) 198, 480-492, Impact Factor: ***22.1 (Q1)***

[109] He, P., Lou, Y., Song, H.*, "Olefin Upgrading under Methane Environment over Ag-Ga/ZSM-5 Catalyst", *Fuel*, (**2016)** 182, 577-587, Impact Factor: *7.4 (Q1)*

[110] Xiao, Y., He, P., Cheng, W., Liu, J., Shan, W., Song, H.*, "Converting Solid Wastes into Liquid Fuel using a Novel Methanolysis Process", *Waste Management*, (**2016**) 49, 304-310, Impact Factor: *8.1 (Q1)*

[111] He, P., Shan, W., Xiao, Y., Song, H.*, "Performance of Zn/ZSM-5 for In Situ Catalytic Upgrading of Pyrolysis Bio-oil by Methane", *Topics in Catalysis*, (**2016**) 59(1), 86-93, Impact Factor: *3.6*

[112] Guo, A., Wu, C., He, P., Luan, Y., Zhao, L., Shan, W., Cheng, W., Song, H.*, "Low-Temperature and Low-Pressure Nonoxidative Activation of Methane for Upgrading Heavy Oils", *Catalysis Science & Technology*, (**2016**) 6, 1201-1213, Impact Factor: *5.0*

[113] He, P., Y. Tang, J. Zhang, Xiao, Y., Song, H.*, "Simultaneous Low-Cost Carbon Sources and CO_2 Valorizations through Catalytic Gasification", *Energy & Fuels*, (**2015**) 29 (11), 7497–7507*,* Impact Factor: *5.3 (Q2)*

[114] Shan, W., Song, H.*, "Catalysts for the Selective Catalytic Reduction of NO_x with NH_3 at Low Temperature", *Catalysis Science & Technology*, (**2015**) 5, 4280-4288, Impact Factor: *5.0*

[115] He, P., Song, H.*, "Catalytic Conversion of Biomass by Natural Gas for Oil Quality Upgrading", *Industrial & Engineering Chemistry Research*, (**2014**) *53* (41), 15862-15870, Impact Factor: *4.2*

[116] Guo, A., Zhou, Y., Chen, K., Xue, Z., Wang, Z., Song, H.*, "Co-processing of Vacuum Residue/Fraction Oil Blends: Effect of Fraction Oils Recycle on the Stability of Coking Feedstock", *Journal of Analytical and Applied Pyrolysis* (**2014**) *109*, 109-115, Impact Factor: *6.437*

[117] Guo, A., Wei, Z., Zhao, B., Chen K., Liu, D., Wang, Z., Song, H.*, " Separation of Toluene-Insoluble Solids in the Slurry Oil from a Residual Fluidized Catalytic Cracking Unit: Determination of the Solid Content and Sequential Selective Separation of Solid Components", *Energy & Fuels*, (**2014**) *28* (5), 3053-3065, Impact Factor: *5.3 (Q2)*

[118] Song, H., Zhang, L., Ozkan, U.S., "The Effect of Surface Acidic and Basic Properties on the Performance of Cobalt-Based Catalysts for Ethanol Steam Reforming", *Topics in Catalysis*, (**2012**) *55* (19-20), 1324-1331, Impact Factor: *3.6*

[119] Song, H., Bao, X., Hadad, C., Ozkan, U.S., "Adsorption/Desorption Behavior of Ethanol Steam Reforming Reactants and Intermediates over Supported Cobalt Catalysts", *Catalysis Letters*, (**2011**) *141* (1), 43-54, Impact Factor: *2.8*

[120] Song, H., Zhang, L., Ozkan, U.S., "Investigation of the Reaction Network in Ethanol Steam Reforming over Supported Cobalt Catalysts", *Industrial & Engineering Chemistry Research*, (**2010**) *49* (19) 8984-8989, Impact Factor: *4.2*

[121] Song, H., Mirkelamoglu, B., Ozkan, U.S., "Effect of Cobalt Precursor on the Performance of Ceria-Supported Cobalt Catalysts for Ethanol Steam Reforming", *Applied Catalysis A: General* (**2010**) *382* (1), 58-64, Impact Factor: *5.5*

[122] Song, H., Ozkan, U.S., "Changing the Oxygen Mobility in Co/Ceria Catalysts by Ca Incorporation: Implications for Ethanol Steam Reforming", *Journal of Physical Chemistry A: General* (**2010**) *114* (11) 3796-3801, Impact Factor: *2.9*

[123] Song, H., Ozkan, U.S., "The Role of Impregnation Medium on the Activity of Ceria-supported Cobalt Catalysts for Ethanol Steam Reforming", *Journal of Molecular Catalysis A: Chemical* (**2010**) *318*(1-2), 21-29, Impact Factor: *5.008*

[124] Song, H., Ozkan, U.S., "Economic Analysis of Hydrogen Production through a Bio-ethanol Steam Reforming Process: Sensitivity Analyses and Cost Estimations", *International Journal of Hydrogen Energy* (**2010**) 35, 127-134, Impact Factor: *7.2*

[125] Song, H., Tan, B., Ozkan, U.S., "Novel Synthesis Techniques for Preparation of Co/CeO_2 as Ethanol Steam Reforming Catalysts", *Catalysis Letters* (**2009**) *132*(3-4), 422-429, Impact Factor: *2.8*

[126] Song, H., Ozkan, U.S., "Ethanol Steam Reforming over Cobalt-based Catalysts: Role of Oxygen Mobility", *Journal of Catalysis* (**2009**) *261*, 66-74, Impact Factor: *7.3 (Q1)*

[127] Song, H., Zhang, L., Ozkan, U.S., "Investigation of Bio-ethanol Steam Reforming over Cobalt-based Catalysts", *Catalysis Today* (**2007**) *129*(3-4), 346-354, Impact Factor: *6.562 (Q1)*

[128] Song, H., Zhang, L., Ozkan, U.S., "Effect of Synthesis Parameters on the Catalytic Activity of Co/ZrO_2 for Bio- ethanol Steam Reforming", *Green Chemistry* (**2007**) *9*, 686-694, Impact Factor: *9.8 (Q1)*

[129] Song, H., Chen, F.M., "Separation of Soybean Phospholipids by Column Chromatography", *China Oils and Fats* (**2005**), *30*(2), 41-43, Impact Factor: *1.109*

[130] Song, H., Chen, F.M., "New Continuous Preparative Chromatography for Multi-Component Separation: Array Column Chromatography", *Chemical Industry and Engineering* (**2005**), *22*(2), 148-153, Impact Factor: *0.801*

ii) Books and Chapters:

[1] Nguyen, H., Omidkar, A., Song, H.*, “Plasma-Catalyzed Crude Oil Upgrading: A Pathway Toward Carbon-Neutral Solutions", Handbook of Climate Change Mitigation and Adaptation, ISBN: 9781461464310, Springer (2025)

[2] Alagumalai, A., Song, H.*, “Biorefining Under Methane Atmosphere", Encyclopedia of Green Chemistry, ISBN: 9780443157424, Elsevier (2025)

[3] Li, W., Nguyen, H.M., Meng, S., Song, H.*, “Plasma Upgrading and Hydrotreating”, Advances in Hydrotreating for Integrated Biofuel Production, ISBN: 9780443190766, Elsevier (2024)

[4] Omidkar, A., Haddadian, K., Song, H.*, “Life cycle analysis and technical economic analysis of bio-oil hydrotreating”, Advances in Hydrotreating for Integrated Biofuel Production, ISBN: 9780443190766, Elsevier (2024)

[5] Jarvis, J., Bonatti, E., Song, H.*, “Methane and Syngas Assisted Hydrotreating for Biofuel Production”, Advances in Hydrotreating for Integrated Biofuel Production, ISBN: 9780443190766, Elsevier (2024)

[6] Song, H.*, Jarvis. J., Meng. S., Xu. H., Li. Z., Li. W., “Methane Activation and Utilization in the Petrochemical and Biofuel Industries”, ISBN 978-3-030-88423-9, Springer Nature (2022)

[7] Wang, A., He, P., Song, H.*, "Lignin valorization”, Recent Advances in Bioconversion of Lignocellulose to Biofuels and Value Added Chemicals within the Biorefinery Concept, ISBN 978-0-12-818223-9, Elsevier (2020)

[8] He, P., Song, H.*, "Catalytic Hydrogen Production from Bioethanol", Advances in Hydrogen Production and Storage, Vol. 1, ISBN 978-1-119-28364-5, Wiley-Scrivener (2017)

[9] Wang, A., Song, H.*, "Catalytic Biomass Valorization", Biomass Volume Estimation and Valorization for Energy, ISBN 978-953-51-2937-0, Rijeka, Croatia: InTech (2017)

[10] He, P., Song, H.*, “Catalytic Natural Gas Utilization on Unconventional Oil Upgrading”, Advances in Natural Gas Emerging Technologies, ISBN 978-953-51-3433-6 Rijeka, Croatia: InTech (2017)

[11] Zhang, C., Song, H.*, “Recent Progress in Catalytic Hydroprocessing of Heavy Petroleum Feeds”, Advances in Petroleum Engineering I Refining, ISBN: 1-62699-042-5, Houston, U.S.A., Studium Press (2015)

[12] Song, H., “Catalytic Hydrogen Production from Bioethanol”, Bioethanol, ISBN: 978-953-51-0008-9, Rijeka, Croatia: InTech

[13] Song, H., Catalytic Hydrogen Production from Bioethanol, ISBN: 978-3-639-34441-7, Saarbrücken, Germany: VDM

iii) Technical reports:

- “Catalytic Heavy Oil Partial Upgrading under Natural Gas”, NSERC Final Report, CRDPJ/531607-2018, July 2021
- “Catalytic Heavy Oil Partial Upgrading under Natural Gas”, Alberta Innovates Final Report, AI-2552, July 2021
- “Catalytic Heavy Oil Partial Upgrading under Natural Gas”, Alberta Innovates Midterm Report, AI-2552, June 2020
- “Non-thermal plasma assisted catalytic bitumen partial upgrading under methane environment”, NSERC Final Report, CRDPJ/506994-2016, January 2020
- “Catalytic Light Olefin Upgrading by Methane”, Alberta Innovates Final Report, AI-2142, January 2017
- “Catalytic heavy crude oil upgrading using natural gas”, NSERC Final Report, CRDPJ/460752-2013, June 2016
- “Catalytic Light Olefin Upgrading by Methane”, Alberta Innovates Annual Report, AI-2142, February 2016
- “Catalytic Light Olefin Upgrading by Methane”, Alberta Innovates Midterm Report, AI-2142, May 2015
- “An Integrated Process to Simultaneously Convert Natural Gas and Low-cost Resources to Liquid Fuels”, Alberta Innovates Final Report, AI-2105, October 2014

- "An Integrated Process to Simultaneously Convert Natural Gas and Low-cost Resources to Liquid Fuels", Alberta Innovates Annual Progress Report, AI-2105, October 2014
- "An Integrated Process to Simultaneously Convert Natural Gas and Low-cost Resources to Liquid Fuels", Alberta Innovates Semi-annually Progress Report, AI-2105, April 2014
- "Conversion of CO_2 into Commercial Materials Using Carbon Feedstocks", Quarterly Progress Report, US Department of Energy, DE-FE0004329, April 2011- June 2012
- "Low Temperature Catalytic NO_x Control in the Flue Gas", Final Report, Babcock & Wilcox R002FD1007, December 2011
- "Low Temperature Catalytic Coal/Biomass Gasification", Final Report, Babcock & Wilcox R002FD1006, January 2010
- "Selective Catalytic Oxidation of Ammonia", Final Report, Babcock & Wilcox R002FD7004, January 2010
- "Ammonia Less NO_x Control", Final Report, Babcock & Wilcox R002FD9002, December 2009
- "Investigation of reaction networks and active sites in bio-ethanol steam reforming over Co-based catalysts", Quarterly and Annual Progress Report, US Department of Energy, DE-FC36-05GO15033, April 2006-April 2009

D. Technology Transfer:

i) Consulting:

- Kara Technologies, August 2017 ~ Present

ii) Licensing:

- "Plasma-assisted ammonia and value-added hydrocarbons productions from CH_4 and N_2", licensed to Carbon Upcycling Technologies
- "Organic solid biomass conversion for liquid fuels/chemicals production in the presence of methane containing gas environment and catalyst structure", licensed to Shell International
- "Methane Assisted Biocrude Desulfurization", licensed to Cielo Waste Solutions
- "Catalytic Heavy Oil Partial Upgrading Using Natural Gas" licensed to StrathCona Resources and VODA Midstream
- "Catalytic Valorization of Municipal Solid Wastes" licensed to Directex from Mexico and E2S2-Systems from Singapore

iii) Patents:

[1] Song, H., Jarvis, J., Li, Z., Method of Deoxygenation of a Hydrocarbon in the Presence of Methane-Containing Gas Environment and Catalyst Structure, (**2022**), PCT/IB2022/053945, ***Filed***

[2] Song, H., Pan, X., Zhang, F., He, P., Jarvis, J., Ning, D., Luan, B., Li, Q., A Zeolite Based Aromatization Catalyst and its Synthesis Method as well as Associated Applications, CN 112939015A, ***Filed***

[3] Song, H., A Light Crude Desulfurization Method under Non-Hydrogen Environment, (**2020**), CN 111676051A, ***Filed***

[4] Song, H., Song, Y. A Light Crude Aromatization method, (**2020**), CN 111675596A, ***Filed***

[5] Song, H., Xu, H., Li, Z., Li, Y., Method of Methyl Cyclopentene Production from Cyclohexene over Zeolite-Based Catalyst Structure, (**2020**), PCT/IB2021/057565, US17/404,052, ***Filed***

[6] Song, H., Xu, H., Li, Z., Li, Y., Method of Light Oil Desulfurization in the Presence of Methane Containing Gas Environment and Catalyst Structure, (**2020**), PCT/IB2021/057564, US17/404,054, ***Approved***

[7] Song, H., Organic Solid Wastes Conversion for Liquid Fuels/Chemicals Production in the Presence of Methane Containing Gas Environment and Catalyst Structure, (**2020**), PCT/IB2021/057789, US12,006,475, ***Approved***

[8] Song, H., A catalyst for non-thermal plasma assisted catalytic liquefaction of light hydrocarbons and its synthesis method, (**2020**), CN 202010108613.2, ***Approved***

[9] Song, H., A method for asphaltene upgrading, (2020), CN 11234860A, ***Filed***

[10] Song, H., A process for light hydrocarbons liquefaction through non-thermal plasma assisted catalysis, (2020), CN 202010108613.2, ***Approved***

[11] Song, H., A catalyst for highly selective n-paraffin isomerization and aromatization and its synthesis method, (2020), CN 111229299A, ***Filed***

[12] Jarvis, J., Song, H., Bimetallic non-acidic aluminosilicate porous composite for the effective direct aromatization of n-alkanes, (2020), US 62/978,134, ***Filed***

[13] Song, H., Aiken, B., He, P., Meng, S., Catalyst structure and method of upgrading hydrocarbons in the presence of the catalyst structure, (2020), PCT/IB2020/000151, US16/792,574, JP2022-521917 ***Approved***

[14] Song, H., Wang, A., Meng, S., A catalyst for non-thermal plasma catalytic conversion of light alkanes, (2020), US 62962359, ***Filed***

[15] Song, H., A facility for non-thermal plasma assisted catalysis, (2020), CN 202020194079.7, ***Approved***

[16] Song, H., Meng, S., Wang, A., Non-thermal plasma assisted catalytic liquefaction of light alkanes, US 62962471, ***Filed***

[17] Song, H., A process for liquid fuel and chemical productions from organic solid wastes through catalytic gasification and low-pressure liquefaction, (2018), PCT/CN2018/112224, CN 109233913A, ***Filed***

[18] Jarvis, J., Song, H., He, P., Wang, A., Harrhy, J., A Highly Active Acidic Metallic Porous Composite for the Effective Isomerization & Aromatization of Paraffinic Feeds, (2018), US 62/685,451, ***Filed***

[19] Song, H., A process for simultaneous NO_x and SO_x removals from FCC flue gas and NH_3 containing acidic gas in refineries, (2018), CN 201810778247.4, ***Approved***

[20] Song, H., A multifunctional facility for catalytic performance evaluation, (2018), ZL 201721355013.6, ***Approved***

[21] Song, H., A multifunctional fluidized bed reactor system, (2018), CN 201721352554.3, ***Approved***

[22] Song, H., A multifunctional fixed bed reactor system, (2018), CN 201721352545.4, ***Approved***

[23] Song, H., A multifunctional gas manifolding system, (2018), CN 201721371556.7, ***Approved***

[24] Song, H., Luan, B., Wang, Y., Zhang, F., He, P., Li, Y., Li, Q., Jarvis, J., Zhao, K., A Catalyst for Paraffin-rich Oil Aromatization under Methane Environment and its Synthesis Method, (2020), CN 201710680889.6, ***Approved***

[25] Song, H., Luan, B., Wang, Y., Zhang, F., Li, Q., Zhao, K., He, P., Jarvis, J., Li, Y., A Process for Producing Aromatic-rich Oil, (2019), CN 201710369011.0, ***Approved***

[26] Song, H., A Catalyst for Heavy Oil Upgrading under Methane Environment and its Synthesis Method, (2017), CN 107029780A, ***Filed***

[27] Song, H., A facility for synthesis gas cleanup, (2017), CN 201621456911.6, ***Approved***

[28] Song, H., A facility for synthesis gas liquefaction, (2017), CN 201621455751.3, ***Approved***

[29] Song, H., A catalyst for synthetic gas liquefaction and its synthesis method, (2017), CN 201410347535.6, ***Approved***

[30] Song, H., A tube reactor for catalyst thermal treatment, (2017), CN 201621457681.5, ***Approved***

[31] Song, H., A facility for municipal solid waste gasification, (2017), CN 201621458304.3, ***Approved***

[32] Song, H., A catalyst for low temperature sulfur tolerant selective catalytic reduction of NO_x and its synthesis method, (2017), CN 201410312707.6, ***Approved***

[33] Song, H., A facility for nonhazardous utilization and valorization of municipal solid waste, (2017), CN 201621458303.9, ***Approved***

[34] Song, H., A facility for nonhazardous utilization and valorization of municipal solid waste, (2016), CN 201620443464.4, ***Approved***

[35] Song, H., A catalyst for low temperature sulfur tolerant selective catalytic reduction of NO_x and its synthesis method, (2016), CN 201410313228.6, ***Approved***

[36] Song, H., A facility for solid wastes gasification, (2016), CN 201620442123.5, ***Approved***

[37] Song, H., A facility for synthesis gas liquefaction, (2016), CN 201620443058.8, ***Approved***

[38] Song, H., A facility for synthesis gas cleanup, (2016), CN 201620442124.X, ***Approved***

[39] Song, H., A catalyst for CO_2 gasification of coal and its synthesis method, (2015), CN 104907076 A, ***Filed***

[40] Song, H., Shu Yao, A catalyst for CO_2 gasification of municipal solid wastes and its synthesis method, (2014), CN 103933995 A, ***Filed***

[41] Ghorishi, B., Velazquez-Vargas, L.G., Song, H., Ji, L., A novel redox method for capture of total gaseous mercury by wet FGD. (2012) U.S. 8,092,766 B2, ***Approved***

[42] Chen, F., Song, H., Array type continuously preparative chromatographic system and application, (2006), CN 1283993C, ***Approved***

[43] Chen, F., Song, H., Collector exclusively designed for array type continuously preparative chromatography, (2004) CN 2645080Y, ***Approved***

V. SERVICE ACTIVITIES

A. University Service:

i) TUCFA Representative (2014-2015)

ii) Chair of Career Leadership Sub-committee at SSE Diversity and Inclusivity Action Committee (2016~2018)

iii) Member of Energy Engineering Program Committee (2017~2018)

iv) Member of SSE Safety Improvement Team (2022~2023)

v) Judge for 3MT Competition at Department of Chemical and Petroleum Engineering (2016)

vi) Adjudicator for graduate and undergraduate scholarship applications (Total: More than **600** applications):

- 15 applications for 2023 Medals Doctoral Competition (June 2023)
- 35 applications for 2023 Graduate Award Competition (March 2023)
- 36 applications for 2022 Graduate Award Competition (March 2022)
- 29 applications for 2022 FGS Entrance Competition (March 2022)
- 44 applications for 2021 Graduate Award Competition (March 2021)
- 7 applications for 2020 Medals Doctoral Competition (July 2020)
- 50 applications for 2020 Graduate Award Competition (April 2020)
- 43 applications for 2018 Graduate Award Competition (April 2018)
- 43 applications for 2017 Graduate Award Competition (April 2017)
- 45 applications for NSERC CGSM Competition (January 2017)
- 14 applications in the doctoral category for the GOLD MEDALS (Governor General's Gold Medal and Chancellor's Graduate Medals) competition (July ~ August, 2016)
- 53 applications for 2016 Graduate Award Competition (March, 2016)
- 5 applications for 2016 PURE award (March, 2016)
- 57 applications for 2015 Graduate Award Competition (2015)
- 45 applications for 2015 NSERC CGS Master's Competition (2015)
- 38 applications for 2014 NSERC CGS Competition (2014)
- 2014 CGS University Microfilms International Distinguished Dissertation Awards (July 2014)
- 2014 AITF research proposals (February 2014)
- 45 applications for 2013 NSERC CGS Competition (2013)
- 10 applications for 2013 PURE award (2013)

vii) Neutral Chair:

- Ghada Hamdy Nafie (April 2020, Ph.D. Defense, Chemical and Petroleum Engineering)
- Qinwan Chong (December 2019, Ph.D. Defense, Chemical and Petroleum Engineering)
- Farouq Ahmed (April 2018, M.Eng. Defense, Chemical and Petroleum Engineering)
- Tianlin Zhang (March 2016, M.Sc. Defense, Chemical and Petroleum Engineering)
- Syed Sabbir Ahmed (September 2013, M.Sc. Defense, Electrical and Computer engineering)
- Emadoddin Livani (April 2013, Ph.D. Defense, Electrical and Computer Engineering)
- Rashid Popal (March 2013, M.Sc. Defense, Civil Engineering)
- Alba Corona Hernandez (January 2013, M.Sc. Defense, Chemical and Petroleum Engineering)

B. Professional Service:

i) Memberships:

- Member of executive committee of Energy Division of Chemical Institute of Canada
- Member of American Chemical Society (ACS), American Institute of Chemical Engineers (AIChE), Association of Professional Engineers and Geoscientists of Alberta (APEGA), Sigma Xi, and North American Catalysis Society (NACS)

ii) Editorships:

- Editor in Chief of International Journal of Renewable Energy Technology
- Editorial board member of Frontiers in Chemistry – Inorganic Chemistry, Journal of Materials Science and Chemical Engineering, Chemical Engineering, AIMS Materials Science, and Journal of Chemical Engineering & Process Technique
- Guest editor of a special issue of EES Catalysis
- Executive guest editor of a special issue of Green Energy and Resources
- Guest editor of a special issue of Energy & Fuels

iii) Conference organization:

- Organizer of the "Thermochemical Conversion Processes" sessions for 2015 CSChE National Conference
- Presider of the honor symposium for 2012 PETR Distinguished Researcher at 244th ACS National Meeting
- Presider of the "New Opportunities for Recovery and Conversion of Fossil Fuels" sessions at 247th ACS National Meeting

iv) Journal reviews: Nature, Nature Communications, Journal of the American Chemical Society, Angewandte Chemie, Journal of Catalysis, Journal of Physical Chemistry, Bioresource Technology, ACS Applied Nano Materials, ACS Applied Materials & Interfaces, Environmental Science & Technology, Chemical Engineering Journal, Journal of Cleaner Production, Inorganic Chemistry Frontiers, RSC Advances, Applied Energy, Applied Catalysis B: Environmental, International Journal of Hydrogen Energy, Waste Management, Journal of Analytical and Applied Pyrolysis, Catalysis Today, Topics in Catalysis, Energy & Fuels, Fuel, Industrial & Engineering Chemistry Research, ChemCatChem, ChemSusChem, Catalysis Communications, Catalysis Letters, AICHE Journal, Canadian Journal of Chemical Engineering, etc.

v) Grant reviews: NSERC Strategic Partnership Grants, NSERC Alliance Grant, ACS Petroleum Research Fund-New Directions, National Science Centre of Poland, Netherlands Organization for Scientific Research, Swiss National Science Foundation, Canada foundation for innovation, Mitacs Accelerate, and Fund from Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C^5MPT), Competitive Research Grants from King Abdullah University of Science and Technology (KAUST)

C. Public Service:

i) As president (February 2021 ~ September 2022) Tsinghua Alumni Association of Calgary, I have managed the daily operation and organized a series of activities

ii) As vice president and member of trustee council of Tsinghua Alumni Association of Calgary, I have dedicated myself to the following duties for the association:

- Organized and chaired 2019 Annual General Meeting held on November 10, 2019
- Co-organized 2020 Spring Festival Celebration Event and successfully raised $5,500 CAD for this event held on January 26, 2020

VI. OTHER ACTIVITES

A. Hobbies:

- Long-distance running, swimming, chess