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Working Experience

- Assistant Professor in College of Engineering of Peking University (9/2021-Now)
- Assistant Professor in Mechanical Engineering of the Hong Kong Polytechnic University (10/2020-6/2021)
- Postdoctoral in Chemical & Biological Engineering and Mechanical & Aerospace Engineering of Princeton University (11/2019-9/2020)

Education

- Ph.D in Mechanical & Aerospace Engineering of Princeton University (09/2013-08/2019)
- M.Sc. in Earth & Environmental Engineering of Columbia University (09/2012-05/2013)
- B.S. in Thermal & Power Engineering of Southeast University, China (09/2008-06/2012)

Research Interest

To solve fundamental problems of energy conversion in advanced engines, propulsion systems, and chemical synthesis by using non-equilibrium theory, such as studies in biofuel chemistry, extreme combustion, plasma-assisted synthesis, advanced power/propulsion systems, low-carbon energy conversion, Advanced battery fire safety

Awards

- The “Bernard Lewis Fellowship” of the International Combustion Institute (2022)
- Excellent Young Researcher, National Natural Science Foundation of China (2021)
- The Karl H. Walther Award (in recognition of the best article “A Supercritical Jet-stirred Reactor” published in the journal, *Fusion*, in 2019, by the American scientific glassblowers society)
- Princeton First Year Fellowship for Graduate Student (2013)
- Fullshare Enterprise Fellowship for Excellent Study in Columbia University (2013)

Invited Talks

- Hao Zhao, “In situ identification of NNH and N_2H_2 by using molecular-beam mass spectrometry in plasma-assisted catalysis for NH_3 synthesis”, The 3rd Symposium on Plasma and Energy Conversion (2021), Wuhan, China
- Hao Zhao, “Low and high temperature oxidation of n-butane/propane up to 100 atm using a supercritical-pressure jet-stirred reactor”, The 5th International Workshop on Flame Chemistry (2020), Online

- Hao Zhao, “Kinetic study of low temperature oxidation of n-pentane with nitric oxide addition in a jet stirred reactor”, The 2017 ACEEES Environment & Energy Forum (2017), Canary Islands, Spain
- Hao Zhao, “Extreme combustion: a new frontier in combustion research”, Department of Mechanical Engineering, The Hong Kong Polytechnic University (2019)
- Hao Zhao, “Extreme combustion: a new frontier in combustion research”, Department of Mechanical Engineering, University of Kentucky (2019)
- Hao Zhao, “Kinetic study of low temperature oxidation of n-pentane with nitric oxide addition in a jet stirred reactor”, Department of Chemistry and Environmental Science, New Jersey Institute of Technology (2017)

Journal Publications (* Corresponding Author)

[27] **Hao Zhao***, Chao Yan, Guohui Song, Ziyu Wang, Yiguang Ju, Studies of low and intermediate temperature oxidation of propane up to 100 atm in a supercritical-pressure jet-stirred reactor, *Proc. Combust. Inst.* (2023) In press. https://doi.org/10.1016/j.proci.2022.07.086

[26] Ziyu Wang, **Hao Zhao***, Chao Yan, Ying Lin, Aditya D. Lele, Wenbin Xu, Brandon Rotavera, Ahren W. Jasper, Stephen J. Klippenstein, Yiguang Ju, Methanol oxidation up to 100 atm in a supercritical pressure jet-stirred reactor, *Proc. Combust. Inst.* (2023) In press. https://doi.org/10.1016/j.proci.2022.07.068

[25] **Hao Zhao**, Guohui Song, Zhe Chen, Xiaofang Yang, Chao Yan, Shota Abe, Yiguang Ju, Sankaran Sundaresan, Bruce E. Koel*, In situ identification of NNH and N_2H_2 by using molecular-beam mass spectrometry in plasma-assisted catalysis for NH_3 synthesis, *ACS Energy Lett.*, 7 (2022) 53–58. **(Impact Factor=23.1, Front Cover)**

[24] Qi Dong, Yonggang Yao, Sichao Cheng, Konstantinos Alexopoulos, Jinlong Gao, Sanjana Srinivas, Yifan Wang, Yong Pei, Chaolun Zheng, Alexandra H. Brozena, Xizheng Wang, Jiaqi Dai, **Hao Zhao**, Weiqing Zheng, Hilal Ezgi Toraman, Zhiwei Lin, Bao Yang, Yiguang Ju, Dionisios G. Vlachos, Dongxia Liu, Liangbing Hu*, Programmable Heating and Quenching for Efficient Thermochemical Synthesis, *Nature*, 605 (2022) 470-476. **(Front Cover)**

[23] Junfeng Bai, Peng Zhang, Chong-Wen Zhou, **Hao Zhao***, Theoretical Studies of Real-Fluid Oxidation of Hydrogen Under Supercritical Conditions by Using the Virial Equation of State, *Combust. Flame,* (2021) In press. https://doi.org/10.1016/j.combustflame.2021.111945

[22] Chao Yan, **Hao Zhao***, Ziyu Wang, Guohui Song, Ying Lin, Clayton R. Mulvihill, Ahren W. Jasper, Stephen J. Klippenstein, Yiguang Ju, Low- and intermediate-temperature oxidation of dimethyl ether up to 100 atm in a supercritical pressure jet-stirred reactor, *Combust. Flame,* (2022) In Press. https://doi.org/10.1016/j.combustflame.2022.112059

[21] **Hao Zhao***, Chao Yan, Tianhan Zhang, Guoming Ma, Michael J. Souza, Chongwen Zhou, and Yiguang Ju, Studies of high-pressure n-butane oxidation with CO_2 dilution up to 100 atm using a

supercritical-pressure jet-stirred reactor, *Proc. Combust. Inst.* 38 (2021) 279-287.

[20] **Hao Zhao***, Shixiang Liu, Can Huang, Chao Yan, Yongfeng Qi, Feng Zhang, Yiguang Ju, Studies of ozone-sensitized low- and high-temperature oxidations of diethyl carbonate, *J. Phys. Chem. A* 125 (2021) 1760-1765.

[19] Chao Yan*, Xiaofang Yang, **Hao Zhao**, Hongtao Zhong, Guoming Ma, Yongfeng Qi, Bruce E. Koel, and Yiguang Ju, Controlled dy-doping to nickel-rich cathode materials in high temperature aerosol synthesis, *Proc.* Combust*. Inst.* 38 (2021) 6623-6630.

[18] Christopher Burger*, Wenbo Zhu, Guoming Ma, **Hao Zhao**, Adri van Duin, Yiguang Ju, Experimental and computational investigations of ethane and ethylene kinetics with copper oxide particles for chemical looping combustion, *Proc. Combust. Inst.* 38 (2021) 2351-2360.

[17] Mengni Zhou*, Omar R. Yehia, Christopher Reuter, Christopher Burger, Yuki Murakami, **Hao Zhao**, Yiguang Ju, Experimental studies of NO kinetic effects on the n-dodecane cool and warm diffusion flames, *Proc. Combust. Inst.* 38 (2021) 2351-2360.

[16] Guohui Song*, Liang Zhao, **Hao Zhao**, Jun Xiao, Hongyan Wang, Shuqing Guo, Design and Assessment of a Novel Cogeneration Process of Synthetic Natural Gas and Char via Biomass Pyrolysis-Coupled Hydrothermal Gasification, *Ind. Eng. Chem. Res.* 59 (2020) 22205-22214

[15] **Hao Zhao***, Ningbo Zhao, Tianhan Zhang, Shuqun Wu, Guoming Ma, Chao Yan, Yiguang Ju, Studies of multi-channel spark ignition of lean n-pentane/air mixtures in a spherical chamber, *Combust. Flame* 212 (2020) 337-344.

[14] Chao Yan*, Chu Teng, Timothy Chen, Hongtao Zhong, Aric Rousso, **Hao Zhao**, Guoming Ma, Gerard Wysocki, Yiguang Ju, The kinetic study of excited singlet oxygen atom (O^{1D}) reactions with acetylene, *Combust. Flame* 212 (2020) 135-141.

[13] **Hao Zhao***, Zunhua Zhang, Yacine Rezgui, Ningbo Zhao, Yiguang Ju, Studies of high pressure 1,3-butadiene flame speeds and high temperature chemistry using hydrogen and oxygen sensitization, *Combust. Flame* 200 (2019) 135-141.

[12] (**Co-first author**) Zunhua Zhang, **Hao Zhao***, Ling Cao, Gesheng Li, Yiguang Ju, Kinetic effects of n-heptane addition on low and high temperature oxidation of methane in a jet-stirred reactor, *Energy. Fuels* 32 (2018) 11970–11978.

[11] **Hao Zhao***, Lingnan Wu, Charles Patrick, Zunhua Zhang, Yacine Rezgui, Xueliang Yang, Gerard Wysocki, Yiguang Ju, Study of low temperature oxidation of n-pentane with nitric oxide addition in a jet stirred reactor, *Combust. Flame* 197 (2018) 78-87.

[10] **Hao Zhao***, Alon Dana, Zunhua Zhang, William Green, Yiguang Ju, Experimental and modeling study of the mutual oxidation of n-pentane and nitrogen dioxide at low and high temperatures in a jet stirred reactor, *Energy* 165 (2018) 727-738.

[9] **Hao Zhao***, Michael Souza, Yiguang Ju, A supercritical jet-stirred reactor, *Fusion: Journal of the American Scientific Glassblowers Society* 66 (2018) 19-24.

[8] Tianhan Zhang*, **Hao Zhao**, Yiguang Ju, Numerical studies of a novel inwardly off-center shearing

jet-stirred reactor, *AIAA J.* 56 (2018) 3388-3392.

[7] **Hao Zhao***, Jiapeng Fu, Francis M. Haas, Yiguang Ju, Effect of prompt dissociation of formyl radical on 1, 3, 5-trioxane and CH_2O laminar flame speeds with CO_2 dilution at elevated pressure, *Combust. Flame* 183 (2017) 253-260.

[6] **(Co-first author)** Daniel Felsmann*, **Hao Zhao**, Qiang Wang, et al., Contributions to improving small ester combustion chemistry: Theory, model and experiments, *Proc. Combust. Inst.* 36 (2017) 543-551.

[5] Luc-Sy Tran*, Julia Pieper, Hans-Heinrich Carstensen, **Hao Zhao**, et al., Experimental and kinetic modeling study of diethyl ether flames, *Proc. Combust. Inst.* 36 (2017) 1165-1173.

[4] **Hao Zhao***, Xueliang Yang, Yiguang Ju, Kinetic studies of ozone assisted low temperature oxidation of dimethyl ether in a flow reactor using molecular-beam mass spectrometry, *Combust. Flame* 173 (2016) 187-194.

[3] Haiming Gu*, Guohui Song, Jun Xiao, **Hao Zhao**, Laihong Shen, Thermodynamic analysis of the biomass-to-synthetic natural gas using chemical looping technology with CaO sorbent, *Energy Fuels.* 28 (2013) 4695-4704.

[2] **Hao Zhao***, Guohui Song, Yuanyuan Yu, Novel technique route of coal gasification with CO_2 capture using CaO sorbents via three-stage interconnected fluidized beds, *Energy Fuels* 26 (2012) 2934- 2941.

[1] Guohui Song, Jun Xiao*, **Hao Zhao**, et al., A unified correlation for estimating specific chemical exergy of solid and liquid fuels, *Energy* 40 (2012) 164-173.

Conference Publications (* Corresponding Author)

[14] Hao Zhao, Chao Yan, Ziyu Wang, Yiguang Ju, Study of n-heptane oxidation by using a high-pressure jet stirred reactor at 100 atm, AIAA Scitech Forum (2022)

[13] **Hao Zhao***, Chao Yan, Guohui Song, Yiguang Ju, Studies of high-pressure propane oxidation with CO2 dilution up to 100 atm using a supercritical-pressure jet-stirred reactor, AIAA Scitech Forum (2021)

[12] **Hao Zhao***, Ningbo Zhao, Shuqun Wu, Guoming Ma, Chao Yan, Yiguang Ju, Experimental studies of n-pentane/air ignition by using a multi-channel spark, AIAA Scitech Forum (2020)

[11] **Hao Zhao***, Shixiang Liu, Chao Yan, Yiguang Ju, Oxidation of diethyl carbonate with ozone additions at low temperatures in a jet stirred reactor, AIAA Scitech Forum (2020)

[10] **Hao Zhao***, Alon Dana, Zunhua Zhang, William Green, Yiguang Ju, Studies of Low and High Temperature Oxidation of N-pentane with Nitric Oxide and Nitrogen Dioxide Additions in a Jet Stirred Reactor, 11th U.S. Combustion Meeting (2019)

[9] **Hao Zhao***, Ningbo Zhao, Tianhan Zhang, Guoming Ma, Chao Yan, Hongtao Zhong, Yiguang Ju, Studies of multi-channel spark ignition characteristics of n-pentane/air mixture under fuel lean conditions in a spherical bomb, 11th U.S. Combustion Meeting (2019)

[8] **Hao Zhao***, Zunhua Zhang, Yacine Rezgui, Ningbo Zhao, Yiguang Ju, Studies of High Pressure 1,3-Butadiene Flame Speeds and High Temperature Kinetics Using Hydrogen and Oxygen Sensitization, 11th U.S. Combustion Meeting (2019)

[7] **Hao. Zhao***, Lingnan Wu, Charles Patrick, Zunhua Zhang, Yacine Rezgui, Gerard Wysocki, Yiguang Ju, Experimental and Modeling Study of The Mutual Oxidation of N-pentane and NO at Low Temperature in a Jet Stirred Reactor, *56th AIAA Aerospace Sciences Meeting* (2018)

[6] **Hao Zhao***, Zunhua Zhang, Yacine Rezgui, Yiguang Ju, A Study of High Pressure 1,3-Butadiene Laminar Burning Velocity, *56th AIAA Aerospace Sciences Meeting* (2018)

[5] Tianhan Zhang*, **Hao Zhao**, Yiguang Ju, Numerical studies of a novel inwardly off-center shearing jet-stirred reactor, *56th AIAA Aerospace Sciences Meeting* (2018)

[4] **Hao Zhao***, Lingnan Wu, et al, Kinetic study of low temperature oxidation of n-pentane with nitric oxide addition in a jet-stirred reactor, *10th U.S. Combustion Meeting* (2017).

[3] **Hao Zhao***, Jiapeng Fu, Yiguang Ju, Effect of "prompt" dissociation of formyl radical on high temperature oxidation of formaldehyde in the study of 1, 3, 5-trioxane pressurized laminar flame speeds, *55th AIAA Aerospace Sciences Meeting* (2017).

[2] **Hao Zhao***, Xueliang Yang, Yiguang Ju, Studies of ozone assisted low temperature oxidation of dimethyl ether in a flow reactor, *9th U.S. Combustion Meeting* (2015).

[1] **Hao Zhao***, Guohui Song, Laihong Shen et al., Improving coal gasification with in situ CO_2 capture by pressurization in interconnected fluidized beds, *The 2012 Asia-Pacific Power and Energy Engineering Conference* (2012).