

## **Curriculum Vitae: Yong Wang**

Regents Professor

Voiland Distinguished Professor in Chemical Engineering

**Washington State University**

Laboratory Fellow

Associate Director, Institute for Integrated Catalysis

**Pacific Northwest National Laboratory**

wang42@wsu.edu, yong.wang@pnnl.gov, (509) 371-6273 (O), (509) 554-7054 (cell)

<https://voiland.wsu.edu/faculty-staff/yong-wang/>

### **Professional Appointments**

- 2022–present Regents Professor, Voiland School of Chemical Engineering and Bioengineering, Washington State University
- 2009–present Voiland Distinguished Professor (named full professor with tenure), Voiland School of Chemical Engineering and Bioengineering, Washington State University
- 2008–present Laboratory Fellow, Associated Director of Institute for Integrated Catalysis (IIC), Pacific Northwest National Laboratory
- 2005-2007 Laboratory Fellow, Technical Team Leader of Catalysis and Reaction Engineering, Pacific Northwest National Laboratory
- 2000-2004 Chief Scientist, Technical Team Leader of Catalysis and Reaction Engineering, Pacific Northwest National Laboratory
- 1997-1999 Senior Research Engineer, Pacific Northwest National Laboratory
- 1996-1997 Research Engineer, Pacific Northwest National Laboratory
- 1994–1995 Postdoctoral Fellow, Pacific Northwest National Laboratory

### **Education**

- 1992-1993 Ph.D. in Chemical Engineering, Washington State University
- 1990-1992 M.S. in Chemical Engineering, Washington State University
- 1980-1984 B.S. in Chemical Engineering, Chengdu University of Science and Technology (now Sichuan University)

### **Selected Honors and Awards**

- 2021 ACS (American Chemical Society) E.V. Murphree Award in Industrial and Engineering Chemistry (2020)
- 2019 AIChE (American Institute of Chemical Engineers) Catalysis and Reaction Engineering Practice Award (2019)
- Fellow of National Academy of Inventors (NAI) (2015)
- Fellow of AIChE (American Institute of Chemical Engineers) (2013)
- Fellow of RSC (Royal Society of Chemistry) (2013)
- Fellow of ACS (American Chemical Society) (2010)

- Fellow of AAAS (American Association for the Advancement of Science) (2008)
- Member of Washington State Academy of Sciences (2015)
- 2018 ACS (American Chemical Society) I&EC Division Fellow Award (2017)
- Recognition of Innovation on the commercial ADM "Propylene Glycol from Renewable Sources" process presented by DOE EERE Assistant Secretary David Danielson (2015)
- R&D 100 Award, Fischer-Tropsch fuels using Velocys microchannel technology (2008)
- R&D 100 Award, full-scale vaporizer for automotive fuel cell fuel processor (1999)
- R&D 100 Award, production of chemicals from biologically derived succinic acid (1997)
- Presidential Green Chemistry Award, use of biomass to produce useful chemicals (1999)
- Distinguished Alumni Achievement Award, Dept of Chem.Eng., Washington State University (2008)
- 2006 Asian American Engineer of the Year Award, Seattle, WA, Feb. 24-25, 2006.
- 2020 Safety Award, Voiland College of Engineering and Architecture, Washington State University (2020)
- 2006 PNNL Inventor of the Year Award, Pacific Northwest National Laboratory (2006)
- 2004 PNNL Inventor of the Year Award, Pacific Northwest National Laboratory (2004)
- 2004 Distinguished Battelle Inventor Award, April 2004
- First recipient of PNNL Laboratory Director's Award for Exceptional Scientific Achievement, Oct 2005

### **Selected Society Participation**

- 2023-present Co-Editor-in-Chief, *Applied Catalysis B: Environmental*
- 2022-present Executive Editor, *Chemical Engineering Journal*
- 2022 Editor, *Applied Catalysis B: Environmental*
- 2010-2021 Editorial board (founding member), *ACS Catalysis* (founding member)
- 2020-present Editorial board (founding member), *JACS Au*
- 2006-present Editorial board, *Catalysis Today*
- 2012-present Editorial board, *Journal of Energy Chemistry* (2021 impact factor of 13.6)
- 2014-present Editorial board, *Chinese Journal of Catalysis* (2021 impact factor of 12.9)
- 2021 Fundraising committee, NAM27 – The 27th North American Catalysis Society Meeting (raised a record of \$384,000)
- 2020 Fundraising committee, 17th International Congress in Catalysis (2020)
- 2015-2018 Director to the Catalysis and Reaction Engineering Division of AIChE (American Institute of Chemical Engineers)
- 2012 Chair, Energy & Fuel Division of the American Chemical Society
- 2011 Chair elect, Petroleum Division of the American Chemical Society

2008	Chair, Program Committee of the American Chemical Society Petroleum division
2017-2019	ACS National Award Committee (member from 2017-2018, chair of an undisclosed ACS award in 2019)
2006-2014	Secretary of Pacific Coast Catalysis Society
2012-2018	Scientific Advisory Board, Center for Environmentally Beneficial Catalysis, University of Kansas
2013-2015	Scientific Advisory Board, Center for Atomic Level Catalyst Design, LSU EFRC (Energy Frontier Research Center)
2009 June	Secretary of the organization committee of the 21 <sup>st</sup> North American Catalysis Society Meeting, San Francisco, CA
2006-present	Scientific Committee of International Workshop on Process Intensification (IWPI)
2010 Feb	Co-organizer of the Symposium on Combating Global Emissions: The Urgent Need for a New Strategy in the Asia-Pacific Rim", AAAS Annual Meeting, San Diego, CA
2006 Aug	Symposium organizer for the first Joint ACS-AIChE Process Intensification, San Francisco, CA
2006	Co-organizer of The ACS Presidential Event: Plenary Session on Challenges in Hydrogen Economy, ACS National Meeting, San Francisco, CA

### **Research Leadership**

2015–present	Principal Investigator of PNNL emission control program (\$3-4M/year) funded by the Department of Energy's Vehicle Technology Program in collaborations with industries to develop the advanced emission control technologies which enable efficient engines to reduce carbon footprints and meet stringent emission regulations for on-road and off-road applications
2008–present	Associate Director of the PNNL's Institute for Integrated Catalysis (IIC) ( <a href="http://iic.pnl.gov">http://iic.pnl.gov</a> ), co-led the establishment of IIC with ~120 scientists (a largest catalysis research institute among non-industrial organizations in the U.S.), responsible for integrating applied and fundamental catalysis research to reinvent the industrial processes and energy production by using renewable sources of carbon instead of fossil fuels and limiting environmental pollution
2003–present	Co-Principal Investigator of the PNNL fundamental catalysis program (\$5-8M/year led by Johannes Lercher) funded by Basic Energy Sciences' Catalysis Program of the U.S. Department of Energy to address the carbon and energy efficiencies in chemical transformations
2000–2004	Team Leader of Catalysis and Reaction Engineering at PNNL, recruited talents and established a large, applied catalysis and reaction engineering team (>20 scientists) focusing on the development of heterogeneous catalysts, novel catalytic materials, and microchannel reactors for fuel processing, biomass to fuels/chemicals, and gas-to-liquids. This team eventually became a major part of the Institute for Integrated Catalysis (IIC) at PNNL, a largest catalysis

research institute among non-industrial organizations in the U.S. with ~120 scientists.

1997–2004 Principal Investigator of multi-industries and the Department of Energy funded research program (\$4-5M/year) in the development of microchannel reaction technologies for the process intensification of gas/biomass conversion to liquid fuels

### **Research Impact**

- ~90% of 284 issued patents (including 110 issued U.S. patents) in biomass conversion and process intensification have been licensed to industries.
- Made central contributions to the creation of Velocys (traded in London Stock Exchange (VLS)), a leading company on the commercialization of microreactor technology.
- Co-invented the commercial Archer Daniels Midland (ADM) process that converts renewable, plant-based glycerol into propylene glycol at 100,000 metric tons per year.
- Jointly patented catalytic processes with Archer Daniels Midland (ADM) for the production of chemicals such as para-xylene and polyethylene terephthalate (PET) plastics exclusively from renewable biomass (US 9,212,106; US 9,505,671), reinventing the current industrial processes by using renewable biomass instead of fossil feedstocks.
- Discovered the fundamental principles to synthesize and activate highly stable single atom catalysts for emission abatement with drastically reduced usage of Platinum Group Metals (PGMs), that has attracted broad interests from industries, and discovered a novel atom trapping approach (*Science*, 2016) and a creative “nanoglue” confinement approach (*Nature*, 2022) to prepare highly stable single-atom-catalysts to maximize the use of PGMs. Further discovered the fundamental principles to activate such single-atom-catalysts via the hydrothermal treatment to activate the environment of single atom sites (*Science*, 2017). As a principal investigator of a major DOE funded program in collaboration with BASF and Stellantis, Yong and his team recently applied these fundamental insights on single-atom-catalysts and demonstrated 5x reduction in PGMs over the conventional auto emission catalysts.

### **Significant Technical Accomplishments – Publications/Patents; Invited Presentations; Books**

Dr. Wang’s research focuses on the development of fundamental principles required for the design of advanced catalytic materials and, at the same time, combining these new materials with novel reactor concepts leading to sustainable technologies for solving current and future energy, resource, and environmental challenges. The importance of his research to industry is evident in his central contributions to the creation of Velocys (traded in London Stock Exchange (VLS)), a leading company on the commercialization of microreactor technology, and his invention for the commercial Archer Daniels Midland (ADM) process that converts renewable, plant-based glycerol into propylene glycol at 100,000 metric tons per year, reinventing the current industrial processes by using renewable biomass instead of fossil feedstocks. He has 400 peer-reviewed publications in *Science*, *Nature*, *Nature Group journals*, *Science Advances*, *Chem*, *J.Am.Chem.Soc.*, *Angewandte Chemie*, *EES*, *Chem.Rev.*, *Chem.Soc.Rev.*, *Nano Energy*, *Chemical Science*, *Advanced Materials*, *Applied Catal B*, *ACS Catal.*, *J.Catal.*, *Chem.Eng.J.*, etc (H index = 91 and >37,400 citations with an average of >90 citations per paper), holds 284 issued

patents (110 issued US patents, >90% of his issued patents are licensed to industries), has given >190 invited lectures since 2001, and co-edited 6 special journal issues and 2 books in the novel reaction engineering and catalysis for energy related research. His publications and patents primarily focus on addressing the energy and atom efficiency issues related to the catalytic conversion of biomass and fossil feedstocks which include: 1) discoveries of "microchannel technologies" by closely linking catalysis science and reaction engineering to realize process intensification; 2) fundamental understanding of acid/base and redox properties of transition metal oxides for O elimination and C-C bond formation for biomass conversion to fuels and chemicals; 3) elucidation of active sites and reaction pathways on bimetallic catalysts to enable the efficient conversion of biomass and the production of hydrogen from carbon sources; 4) discovery of fundamental principles to synthesize and activate highly stable single atom catalysts for emission abatement.

### Peer-Reviewed Publications (citations: >37,400, H-index= 91)

399. D.Yao, Y.Wang, Y.Li, A.Li, Z.Zhen, J.Lv, F.Sun, R.Yang, J.Luo, Z.Jiang, Y. Wang\*, X.Ma\*, "Scalable synthesis of Cu clusters for remarkable selectivity control of intermediates in consecutive hydrogenation", *Nature Comm.*, 2023 (accepted).
398. K.Khivantsev, N.R. Jaegers, H.A. Aleksandrov, I.Song, X.I.Pereira-Hernandez, M.H.Engelhard, J.Tian, L.Chen, D.Meira, L.Kovarik, G.N. Vayssilov, Y.Wang\*, J.Szanyi\*, "Single Ru(II) ions on ceria as a highly active catalyst for abatement of NO", *J.Am.Chem.Soc.*, 2023, 10.26434/chemrxiv-2021-vr21g-v2(accepted).
397. A.D.Winkelman, V. Dagle, T.L. Lemmon, L. Kovarik, Y. Wang, and R.A. Dagle "Effect of Alkali Metal Addition on Catalytic Performance of Ag/ZrO<sub>2</sub>/SBA-16 Catalyst for Single-Step Conversion of Ethanol to Butadiene." *Catalysis Science & Technology*, 2023, DOI:10.1039/d2cy01722a.
396. N.C.Nelson, T. Andana, K.G. Rappé, and Y. Wang. "Mechanistic insight into low temperature SCR by ceria–manganese mixed oxides incorporated into zeolites." *Catalysis Science & Technology*, 2023, DOI:10.1039/D2CY01921C.
395. F.Lin, W.Hu, N.R.Jaegers, F.Gao, J.Hu, H.Wang, Y.Wang, "Elucidation of the roles of water on the reactivity of surface intermediates in carboxylic acid ketonization on TiO<sub>2</sub>", *J.Am.Chem.Soc.*, 2022, DOI: 10.1021/jacs.2c08511.
394. X. Li, X. I. P. Hernandez, Y. Chen, J. Xu, J. Zhao, C. Pao, C.-Y. Fang, J. Zeng\*, Y. Wang\*, B. C. Gates\*, J. Liu\*, "Functional CeO<sub>x</sub> Nanoglues for Robust Atomically Dispersed Catalysts", *Nature*, 2022, doi: 10.1038/s41586-022-05251-6.
393. C.E. García-Vargas, X.I.Pereira-Hernández, D.Jiang, R.Alcala, A.T. DeLaRiva, A.Datye, Y.Wang, "Highly active and stable single atom Rh1/CeO<sub>2</sub> catalyst for CO Oxidation during redox cycling", *ChemCatChem*, 2022, DOI:10.1002/cctc.202201210.
392. C.García-Vargas, G.Collinge, D.Yun, M. Lee, V.Muravev, Y.Su, X.I.Pereira Hernandez, D.Jiang, V.Glezakou, E.Hensen, R.Rousseau, A.Datye, Y.Wang, "Activation of Lattice and Adatom Oxygen by Highly Stable Ceria-supported Cu Single Atoms", *ACS Catal.*, 2022, <https://doi.org/10.1021/acscatal.2c04001> (cover).
391. J.Liu, Z.Huang, M.Fan, J.Yang, J.Xiao, Y.Wang, "Future Energy Infrastructure and Energy Platform", *Nano Energy*, 2022, doi: 10.1016/j.nanoen.2022.107915.
390. K.Khivantsev, J.Kwak, N.R. Jaegers, I.Z. Koleva, G.N. Vayssilov, M.A. Derewinski, Y.Wang, H. A. Aleksandrov, J.Szanyi, "Identification of the mechanism of NO reduction with ammonia (SCR) on zeolite catalysts", *Chemical Science*, 2022, DOI: 10.1039/D2SC00350C.

389. I.Song, K.Khivantsev, Y.Wu, M.Bowden, Y.Wang, J.Szanyi, "Unusual water-assisted NO adsorption over Pd/FeO calcined at high temperatures: The effect of cation migration", ***Appl.Catal.B: Environmental***, 2022, 318, 121810.
388. R.Liang, J.Li, Y.Wang, Z.Zhang, B.Luan, J.Liu, S.Qian, S.Wan, D.Zhao, H.Xiong, S.Wang, J.Lin, Y.Wang, "Hexagonal boron nitride for selective oxidative dehydrogenation of n-hexane to olefins", ***Appl.Catal.A: General***, 2022, 643, 118763. DOI:10.1016/j.apcata.2022.118763.
387. Y.Wu, T.Andana, Y.Wang, Y.Chen, E.D.Walter, M.H.Engelhard, K.G. Rappé, Y.Wang, F.Gao, U. Menon, R.Daya, D.Trandal, H.An, Y.Zha, K.Kamasamudram, "A comparative study between real-world and laboratory accelerated aging of Cu/SSZ-13 SCR catalysts", ***Appl.Catal.B: Environmental***, 2022, 318, 121807.
386. W.Hu, N.Jaegers, A.D.Winkelman, S.S.Murali, K.T.Mueller, Y.Wang, J.Hu, "Modelling Complex Molecular interactions in Catalytic Materials for Energy Storage and Conversion in Nuclear Magnetic Resonance", ***Frontiers in Catalysis***, 2022, doi: 10.3389/fctls.2022.935174.
385. L.Zhang, Q.Bao, B. Zhang, Y.Zhang, S. Wan, S. Wang, J.Lin, H.Xiong, D. Mei, Y. Wang, "Distinct role of surface hydroxyls in single-atom Pt1/CeO2 catalyst for room-temperature formaldehyde oxidation: acid-base vs redox", ***JACS Au***, 2022, DOI: 10.1021/jacsau.2c00215.
384. J.Zhang, J.Li, B.Sudduth, J.Sun, C.Zhang, H.He, Y.Wang, "Enhanced Selective Hydrogenolysis of Phenolic C-O Bond over Graphene-covered Fe-Co Alloy Catalysts", ***ACS Sus.Chem.Eng.***, 2022, 10.1021/acssuschemeng.2c02075.
383. Y.Wu, Y.Ma, Y.Wang, K.Rappe, N.Washton, Y.Wang, E.Walter, F.Gao, Feng, "Rate Controlling in Low-temperature Standard NH3-SCR: Implications from Operando EPR Spectroscopy and Reaction Kinetics", ***J.Am.Chem.Soc.***, 2022, 144, 22, 9734–9746
382. T.Andana, K.G.Rappé, N.C. Nelson, F.Gao, Y.Wang, "Selective catalytic reduction of NOx with NH3 over Ce-Mn oxide and Cu-SSZ-13 composite catalysts – Low temperature enhancement", ***Appl.Catal.B: Environmental***, 2022, DOI: 10.1016/j.apcatb.2022.121522.
381. H.Pham, A.DeLaRiva, E. Peterson, R.Alcala, K. Khivantsev, J. Szanyi, X.Li, D.Jiang, W.Huang, Y.Sun, P.Tran, Q. Do, C. DiMaggio, Y. Wang, A.Datye, "Designing Ceria/Alumina for Efficient Trapping of Platinum Single Atoms", ***ACS Sus.Chem.Eng.***, 2022, doi:10.1021/acssuschemeng.2c01380.
380. Z.Zhang, P.Han, L.Li, X.Zhang, X.Cheng, J.Lin, S.Wan, H.Xiong, Y.Wang, S.Wang, "Confinement-enhanced selective oxidation of lignin derivatives to formic acid over Fe-Cu/ZSM-5 catalysts under mild conditions", ***ChemSusChem***, 2022, doi: 10.1002/cssc.202200218.
379. B.Qian, S.Yang, J.Zhang, S.Zhou, B.Etschmann, C.Liu, B.Dai, J.Cashion, Y.Wang, H.Wang, L.Zhang, "Waste to worth: a high-temperature water-gas shift magnetite catalyst with encapsulated core-shell structure from coal fly ash", ***Fuel Processing Technology***, 2022, 232, 107265.
378. Y.Zheng, Z.Duan, R.Liang, R.Lv, C.Wang, Z.Zhang, S.Wan, S.Wang, H.Xiong, S.K.Ngaw, J.Lin, Y.Wang, "Shape-dependent performance of Cu/Su2O for photocatalytic reduction of CO2", ***ChemSusChem***, 2022, doi:10.1002/cssc.202200216.
377. H.Li, M.J. Hurlock, B.Sudduth, J. Li; J.Sun, Q.Zhang, Y.Wang, "Acetone to Isobutene Conversion on ZnTiOz: Effects of TiO2 Facet", ***J.Catal.***, 2022, doi:10.1016/j.jcat.2022.03.031.
376. M.Tan, Y.Yang, Y.Yang, J.Chen, Y.Yang, Z.Zhang, J.Lin, S.Wan, S.Wang, Y.Wang, "Hydrogen spillover assisted by oxygenate molecules over nonreducible oxides", ***Nature Comm.***, (2022)13:1457,doi.org/10.1038/s41467-022-29045.

375. H.Zhang, J.Lv, Z.Zhang, C.Du, S.Wang, J.Lin, S.Wan, Y.Wang,\* H. Xiong\*, "Oxidation of methane to Methanol by Water Over Cu/SSZ-13: Impact of Cu Loading and Formation of Active Sites", *ChemCatChem*, 2022, doi.org/10.1002/cctc.202101609.
374. L.Liu, Y.Lin, Y.Hu, Z.Lin, S.Lin, M.Du, L.Zhang, X.Zhang, J.Lin, Z.Zhang, H.Xiong, S.Wang, B.Ge, S.Wan, Y.Wang "ZnAl<sub>2</sub>O<sub>4</sub> spinel supported PdZn catalyst with ppm Pd for methanol steam reforming", *ACS Catal.*, 2022, doi: 10.1021/acscatal.1c04922.
373. L.Zhang, L.Xue, B.Lin, Q.Zhao, S.Wan, Y.Wang, H.Jia, H.Xiong, "Noble Metal Single-Atom Catalysts for the Catalytic Oxidation of Volatile Organic Compounds", *ChemSusChem*, 2022, doi: 10.1002/cssc.202102494R2 (front cover).
372. I.Song, K.Khiantsev, Y.Wang, J.Szanyi, "Elucidating the role of CO in NO storage mechanism on Pd/SSZ-13 with in situ DRIFTS", *J.Phy.Chem.C*, 2022, doi: 10.1021/acs.jpcc.1c1063.
371. H.Peng, T.Dong, S.Yang, H. Chen, Z.Yang, W.Liu, C.He, P.Wu, J.Tian, Y.Peng, X.Chu, D.Wu, T.An, Y.Wang, S.Dai, "Intra-crystalline mesoporous zeolite encapsulation-derived thermally robust metal nanocatalyst in deep oxidation of light alkanes", *Nature Comm.*, 2022, 13, 295. DOI: 10.1038/s41467-021-27828-x.
370. F.Lin, Y. Lu, K. Unocic, S. Habas, M. Griffin, J. Schaidle, H.Meyer III, Y. Wang, H.Wang, "Deactivation by Potassium Accumulation on a Pt/TiO<sub>2</sub> Bifunctional Catalyst for Biomass Catalytic Fast Pyrolysis", *ACS Catal.*, 2021, https://doi.org/10.1021/acscatal.1c02368.s001.
369. B.Sudduth, J.Sun, Y.Wang, "Chemical grafting of highly dispersed VO<sub>x</sub>/CeO<sub>2</sub> for increased catalytic activity in methanol oxidative dehydrogenation", *Catal.Lett.*, 2021, DOI: 10.1007/s10562-021-03862-8.
368. K.Khivantsev, N.R.Jaegers, H.A.Aleksandrov, L.Kovarik, M.A.Derewinski, Y.Wang, G.N. Vayssilov, J.Szanyi, "Biomimetic CO oxidation below -100 °C by a nitrate-containing metal-free microporous system", *Nature Comm.*, 2021, 12, 6033 (2021). https://doi.org/10.1038/s41467-021-26157-3.
367. D.Jiang, Y. Yao, T. Li, G.Wan, X.Pereira-Hernández, Y.Lu, J.Tian, K.Khivantsev, M.H. Engelhard, C.Sun, C.E. García-Vargas, A.S. Hoffman, S. R. Bare, A.K. Datye, L.Hu, Y.Wang, "Tailoring the Local Environment of Pt in Single-Atom Pt<sub>1</sub>/CeO<sub>2</sub> Catalysts for Robust Low-Temperature CO Oxidation", *Angewandte Chemie.Int.Ed*, 2021, 60, 26054-26062, DOI: 10.1002/anie.202108585.
366. H.Xiong, D.Kunwar, D.Jiang, C.E. García-Vargas, H.Li, C.Du, G.Canning, X.I.Pereira-Hernandez, Q.Wan, S.Lin, S.C.Purdy, J.T.Miller, K.Leung, S.S.Chou, H.H.Brongersma, Rik ter Veen, J.Huang, H.Guo\*, Y.Wang\*, A.K.Datye\*, "Engineering catalyst supports to stabilize PdO<sub>x</sub> two-dimensional rafts for water-tolerant methane oxidation", *Nature Catalysis*, 2021, doi: 10.1038/s41929-021-00680-4.
365. K.Khivantsev, X.Weij, L. Kovarik, N.R.Jaegers, E.D.Walter, P.Tran, Y.Wang, J.Szanyi, "Pd/FER vs Pd/SSZ-13 Passive NO<sub>x</sub> Adsorbents: Adsorbate-controlled Location of Atomically Dispersed Pd(II) in FER Determines High Activity and Stability", *Angewandte Chemie.Int.Ed*, 2021, DOI: 10.1002/anie.202107554.
364. H.Li, Q.Wan, C. Du, Q. Liu, J. Qi, X. Ding, S. Wang, S.Wan, J. Lin, C.Tian, L. Li, T.Peng, W.Zhao, H. Zhang, J. Huang, H. Guo, S.Lin, A.K.Datye, H.Xiong, Y. Wang, "Vapor-Phase Self-Assembly to Generate Single Atom Catalysts with Weak Metal-Support Interaction", *Chem*, 2021, DOI: 10.2139/ssrn.3835429.
363. Y.Sun, G.Han, L.Du, C.Du, X.Zhou, Q.Sun, Y.Gao, G.Yin, Y.Li, and Y.Wang, "Photoelectrochemistry-Driven Selective Hydroxyl Oxidation of Polyols: Synergy between Au Nanoparticles and C<sub>3</sub>N<sub>4</sub> Nanosheets", *Chem.Catalysis*, 2021, doi: 10.1016/j.chemcat.2021.09.001.

362. B.J.Sudduth, D.Yun, J.Sun, Y.Wang, "Facet-Dependent Selectivity of CeO<sub>2</sub> nanoparticles in 2-Propanol Conversion", *Journal of Catalysis*, 2021, doi:10.1016/j.jcat.2021.09.009.
361. J.Lai, N.Jaegers, B.Mosevitzky Lis, M.Guo, M.Ford, E.Walter, Y.Wang, J.Hu, I.Wachs, "Structure-Activity Relationships of Hydrothermally Aged Titania-Supported Vanadium-Tungsten Oxide Catalysts for SCR of NO<sub>x</sub> Emissions with NH<sub>3</sub>", *ACS Catal*, 2021, doi: 10.1021/acscatal.1c02130.
360. H.Li, D.Guo, N.Ulumuddin, M.R.Jaegers, J.Sun, B.Peng, J.S.McEwen, J.Hu, Y.Wang, "Elucidating the Cooperative Roles of Water and Lewis Acid-Base Pairs in Cascade C-C Coupling and Self-Deoxygenation Reactions", *JACS Au*, 2021, <https://doi.org/10.1021/jacsau.1c00218>. (cover)
359. C.B.Cockreham, X.Zhang, J.A.Eakin, M.Dewa, H.Li, N.Li, J.Sun, S.Ha, C.F.Ivory, Y.Wang, H.Xu, D.Wu, "Unveiling the Interfacial and Structural Heterogeneity of Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene Etched with CoF<sub>2</sub>/HCl by Integrated in Situ Thermal Analysis", *ACS Appl. Mater. Interfaces*, 2021, doi: 10.1021/acсами.1c10021.
358. X.Zhang, M.E.Reece, C.B.Cockreham, H.Sun, B.Wang, H.Xu, J.Sun, X.Guo, H.Su, Y.Wang, D.Wu "Formation Energetics and Guest – Host Interactions of Molybdenum Carbide Confined in Zeolite Y", *Ind.Eng.Chem.Res*, 2021, doi: 10.1021/acs.iecer.1c02822.
357. X.Zhang, A.C.Strzelecki, C.B.Cockreham, V.G.Goncharov, H.Li, J.Sun, H.Sun, X.Guo, H.Xu, S.Ha, B.Wang, Y.Wang, D.Wu, "Thermodynamics of Molybdenum Trioxide (MoO<sub>3</sub>) Encapsulated in Zeolite Y", *AIChE J*, 2021, doi:10.22541/au.162206667.74058496/v1.
356. J.Zhang, B.Sudduth, J.Sun, L.Kovarik, M.H.Engelhard, Y.Wang, "Elucidating the Active Site and the Role of Alkali Metals in Selective Hydrodeoxygenation of Phenols over Iron-carbide-based Catalyst", *ChemSusChem*, 2021, doi: 10.1002/cssc.202101382.
355. L.Zhang, B.Zhang, P.Xue, J.Li, Z.Zhang, Y.Yang, S.Wang, J.Lin, H.Liao, Y.Wang, Y.Yao, S.Wan, H.Xiong, "The Effect of Pretreatment on the Reactivity of Pd/Al<sub>2</sub>O<sub>3</sub> in Room Temperature Formaldehyde Oxidation", *ChemCatChem*, 2021, <https://doi.org/10.1002/cctc.202101091>.
354. P.Han, Z.Zhang, Z.Chen, J.Lin, S.Wan, Y.Wang, S.Wang, "Critical Role of Al Pair Sites in Methane Oxidation to Methanol on Cu-Exchanged Mordenite Zeolites", *Catalysts*, 2021, 11(6), 751; <https://doi.org/10.3390/catal11060751>.
353. N.R.Jaegers, Y.Wang, J.Hu, I.E.Wachs, "Impact of Hydration on Supported V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> Catalysts as Explored by Magnetic Resonance Spectroscopy", *J.Phy.Chem.C*, 2021 125 (30), 16766-16775, DOI: 10.1021/acs.jpcc.1c04150.
352. J.Tian, J.Li, S.Qian, Z.Zhang, S.Wan, S.Wang, J.Lin, Y.Wang, " Understanding the origin of selective oxidative dehydrogenation of propane on boron-based catalysts", *Appl.Catal.A: General*, 2021, <https://doi.org/10.1016/j.apcata.2021.118271>
351. F.Lin, T.Andana, Y.Wu, J.Szanyi, Y.Wang, F.Gao, "Catalytic Site Requirements for N<sub>2</sub>O Decomposition on Cu-, Co-, and Fe-SSZ-13 Zeolites", *J.Catal*, 2021, <https://doi.org/10.1016/j.jcat.2021.07.012>.
350. Y.Lu, Z.Zhang, H.Wang, Y.Wang, "Toward efficient single-atom catalysts for renewable fuels and chemicals production from biomass and CO<sub>2</sub>", *Appl.Catal.B: Environmental*, 2021, doi.org/10.1016/j.apcatb.2021.120162.
349. B.Qian, J.Zhang, S.Zhou, J.Lu, Y.Liu, B.Dai, C.Liu, Y.Wang, H.Wang, L.Zhang, "Synthesis of (111) facet-engineered MgO nanosheet from coal fly ash and its superior catalytic performance for high-temperature water gas shift reaction", *Appl.Catal.A, General*, 2021, doi: 10.1016/j.apcata.2021.118132.



348. A.J.R.Hensley, G.Collinge, Y.Wang, J.S.McEwen, "Guiding the design of oxidation-resistant Fe-based single atom alloy catalysts with insights from configurational space", *J.Chem.Phy.C*, 2021, doi:10.1063/5.00048698.
347. Y.Chu, U.Sayal, X.S.Li, Y.Qiu, M.Song, M.H.Engelhard, S.D.Davidson, K.Koh, L.C.Meyer, J.Zheng, X.Xie, D.Li, J.Liu, O.Y.Gutierrez, Y.Wang, Y.Shao, "Tuning proton transfer and catalytic properties in triple junction nanostructured catalyst", *Nano Energy*, 2021, doi: 10.1016/j.nanoen.2021.106046.
346. N.G.Petrik, Y.Wang, B.Wen, Y.Wu, R.Ma, A.Dahal, F.Gao, R.Rousseau, Y.Wang, G.A.Kimmel, A.Selloni, Z.Dohnalek, "Conversion of formic acid on single- and nano-crystalline anatase TiO<sub>2</sub>(101)", *J.Phy.Chem.C*, 2021, doi:10.1021/acs.jpcc.1c00571.
345. T.Andana, K.G.Rappé, F.Gao, J.Szanyi, X.P.Hernand, Y.Wang, "Recent advances in hybrid metal oxide–zeolite catalysts for low-temperature selective catalytic reduction of NO<sub>x</sub> by ammonia", *Appl.Catal.B: Environmental*, 2021, doi.org/10.1016/j.apcatb.2021.120054.
344. Y.Cui, Z.Chen, B.Peng, L.Kovarik, A.Devaraj, Z.Li, T.Ma, Y.Wang, J.Szanyi, J. Miller, Y.Wang, F.Gao, "Onset of high methane combustion rates over supported palladium catalysts: from isolated Pd cations to PdO nanoparticles", *JACS Au*, 2021, 10.1021/jacsau.0c00109. (cover)
343. Y.Wu, F.Gao, H.Wang, L.Kovarik, B.Sudduth, Y.Wang, "Probing Acid-base Properties of Anatase TiO<sub>2</sub> Nanoparticles with Dominant {001} and {101} Facets using Methanol Chemisorption and Surface Reactions", *J.Phy.Chem.C*, 2021, doi:10.1021/acs.jpcc.0c11107.
342. A.Wang, Y.Chen, E.D.Walter, N.M.Washton, T.Varga, Y.Wang, F.Gao, "Remarkable self-degradation of Cu/SAPO-34 selective catalytic reduction catalysts during storage at ambient conditions", *Catal.Today*, 2021, 360, 367-374, doi: 10.106/j.cattod.2020.01.034.
341. Y.Zheng, L.Zhang, J.Guan, S.Qian, Z.Zhang, C.Ngaw, S.Wan, S.Wang, J.Lin, Y.Wang, "Controlled Synthesis of Cu<sup>0</sup>/Cu<sub>2</sub>O for Efficient Photothermal Catalytic Conversion of CO<sub>2</sub> and H<sub>2</sub>O", *ACS Sus.Chem.Eng.*, 2021, 10.1021/acssuschemeng.0c07702.
340. S.Xu, N.R. Jaegers, W.Hu, J.H.Kwak, X.Bao, J.Sun, Y.Wang, J.Hu, "High Field 1D and 2D <sup>27</sup>Al MAS NMR Study of θ-, δ-, and γ-Al<sub>2</sub>O<sub>3</sub> Dominated Aluminum Oxides: Toward Understanding the Al Sites in γ-Al<sub>2</sub>O<sub>3</sub>", *ACS Omega*, 2021, 10.1021/acsomega.0c06163.
339. H.Xiong, A.Datye, Y.Wang, "Thermally-stable single atom heterogeneous catalysts", *Advanced Materials*, 2020, DOI: 10.1002/adma.202004319.
338. J.Dong, K.Konstantin, Y.Wang, "Complete low-temperature methane oxidation to enable efficient emission control in natural gas vehicles", *ACS Catal.*, 2020, doi:10.1021/acscatal.0c03338. (cover)
337. F.Lin, H.Wang, Y. Zhao, J.Fu, D.Mei, N.Jaegers, F.Gao, Y. Wang, "Elucidation of Active Sites in Aldol Condensation of Acetone over Single-Facet Dominant Anatase TiO<sub>2</sub> (101) and (001) Catalysts", *JACS Au*, 2020, DOI: 10.1021/jacsau.0c00028. (cover)
336. J.Tian, J.Tan, Z.Zhang, P.Han, M.Yin, S. Wan, J.Lin, S.Wang, Y. Wang, "Direct Conversion of Methane to Formaldehyde and CO on B<sub>2</sub>O<sub>3</sub> Catalysts", *Nature Comm.*, 2020, doi: 10.1038/s41467-020-19517-y.
335. K.Khivantsev, C.Vargas, J.Tian, L.Kovarik, N.R. Jaegers, J.Szanyi, Y.Wang, "Economizing on Precious Metals in Three-Way Catalysts: Thermally Stable and Highly Active Single-Atom Rhodium on Ceria for NO Abatement under Dry and Industrially Relevant Conditions", *Angew.Chem.Int.Ed.*, 2020, DOI: 10.1002/anie.202010815.
334. R.Alcala, A.DeLaRiva, E.J.Peterson, A.Benavidez, C.E.Garcia-Vargas, D.Jiang, X.Pereira-Hernández, H.H.Brongersma, R.ter Veen, J.Staněk, J.T.Miller, Y.Wang, A.Datye, "Atomically

- Dispersed Dopants for Stabilizing Ceria Surface Area", *Appl.Catal.B: Environmental*, 2020, <https://doi.org/10.1016/j.apcatb.2020.119722>.
333. F.Lin, V. Dagle, A.D. Winkelman, M.H. Engelhard, L. Kovarik, Y. Wang, R. Dagle and H. Wang "Understanding the Deactivation of Ag-ZrO<sub>2</sub>/SiO<sub>2</sub> Catalysts for the Single-Step Conversion of Ethanol to Butenes." *ChemCatChem*, 2020, DOI:10.1002/cctc.202001488.
  332. X.Isidro Pereira-Hernández, A.DeLaRiva, V.Muravev, D.Kunwar, H.Xiong, B.Sudduth, M.Engelhard, L.Kovarik, E.J.M. Hensen, Y.Wang, A.K.Datye, Reply to "Pitfalls in identifying active catalyst species", *Nature Comm.*, 2020, 10.1038/s41467-020-18193-2.
  331. J.Pang, M.Zheng, C.Wang, X.Yang, H.Liu, X.Liu, J.Sun, Y.Wang, T.Zhang, "Hierarchical Echinus-like Cu-MFI Catalysts for Ethanol Dehydrogenation", *ACS Catal.*, 2020, 10, 22, 13624–13629.
  330. Y.Zhang, Y.Wu, Y.Peng, J.Li, E.D.Walter, Y.Chen, N.M.Washton, J.Szanyi, Y.Wang, F.Gao, "Quantitative Cu counting methodologies for Cu/SSZ-13 selective catalytic reduction catalysts by EPR spectroscopy", *J.Phys.Chem. C*, 2020, doi:10.1021/acs.jpcc.0c07971. (cover)
  329. N.R. Jaegers, W.Hu, Y.Wang, J.Hu, "High-Temperature and High-Pressure In situ Magic Angle Spinning Nuclear Magnetic Resonance Spectroscopy", *JoVE Journal*, 2020, doi: 10.3791/61794.
  328. Y.Lu, Z.Zhang, F. Lin, H. Wang, Y. Wang, "Single-atom automobile exhaust catalysts", *ChemNanoMat*, 2020, 6(12) 1659-1682, DOI: 10.1002/cnma.202000407R1.
  327. L.Liu, Z.Lin, Y.Chen, S.Chen, X.Zhang, J.Lin, S.Wan, Y.Wang, "Conversion of syngas to methanol and DME on highly selective Pd/ZnAl<sub>2</sub>O<sub>4</sub> catalyst", *J.Energy Chem.*, 2020, doi: 10.1016/j.jechem.2020.10.003.
  326. A.J.R. Hensley, I.deJooode, Y.Wang, J.S.McEwen, "Identifying Trends in the Field Ionization of Diatomic Molecules over Adsorbate Covered Pd(331) Surfaces", *Topics in Catalysis*, 2020, doi: 10.1007/s11244-020-01392-y.
  325. K.Khivantsev, N.R.Jaegers, L.Bovarik, M.Wang, J.Hu, M.A.Derewinski, Y.Wang, J.Szanyi, "The Superior Hydrothermal Stability of Pd/SSZ-39 in Low Temperature Passive NO<sub>x</sub> Adsorption (PNA) and Methane Combustion", *Appl.Catal.B: Environmental*, 2020, <https://doi.org/10.1016/j.apcatb.2020.119449>.
  324. D.Jiang, G. Wan, C. GARCIA, L. Li, X.I.P.Hernandez, C. Wang, Y.Wang, "Elucidation of the Active Sites in Single-Atom Pd<sub>1</sub>/CeO<sub>2</sub> Catalysts for Low-Temperature CO Oxidation", *ACS Catalysis*, 2020, DOI: 10.1021/acscatal.0c02480. (cover)
  323. J.Zhang, J.Sun, Y.Wang, "Hydrodeoxygenation of lignin-derived aromatic oxygenates over Pd-Fe bimetallic catalyst: A mechanistic study of direct C-O bond cleavage and direct ring hydrogenation", *Catalysis Letters*, 2020, DOI: 10.1007/s10562-020-03352-3.
  322. V.Dagle, A.Winkelman, N. Jaegers, J. Saavedra-Lopez, J. Hu, M. Engelhard, S. Habas, S.Akhade, L. Kovarik, V. Glezakou, R. Rousseau, Y. Wang, R.A. Dagle, "Single-step conversion of ethanol to n-butenes over Ag-ZrO<sub>2</sub>/SiO<sub>2</sub> catalysts", *ACS Catal.*, 2020, DOI: 10.1021/acscatal.0c02235. (cover)
  321. Y.Zhang, Y.Peng, J. Li, K. Groden, J. McEwen, E.Walter, Y.Chen, Y. Wang, F.Gao, "Probing Active-Site Relocation in Cu/SSZ-13 SCR Catalysts during Hydrothermal Aging by in situ EPR Spectroscopy, Kinetic Studies, and DFT Calculations", *ACS Catal.*, 2020, DOI: 10.1021/acscatal.0c01590. (cover)
  320. H.Li, J.Peng, N.R.Jaegers, L.Kovarik, M.Engelhard, A.W.Savoy, J.Hu, J.Sun, Y.Wang, "Conversion of ethanol to 1,3-butadiene over Ag-ZrO<sub>2</sub>/SiO<sub>2</sub> catalysts: The role of surface interfaces", *J.Energy.Chem.*, 2020, 54, 7-15. <https://doi.org/10.1016/j.jechem.2020.05.038>.

319. Y. Yang, M. Tan, A. Garcia, Z. Zhang, J. Lin, S. Wan, J.S. McEwen, S. Wang, Y. Wang, "Controlling the Oxidation State of Fe-based Catalysts Through Nitrogen Doping Toward the Hydrodeoxygenation of m-Cresol", *ACS Catal.*, 2020, doi.org/10.1021/acscatal.0c00626. (cover)
318. J. Zhang, J. Sun, L. Kovarik, M.H. Engelhard, L. Du, B. Dudduth, H. Li, Y. Wang, "Surface Engineering of Earth-abundant Fe Catalysts for Selective Hydrodeoxygenation of Phenolics in Liquid Phase", *Chemical Science*, 2020, DOI: 10.1039/D0SC00983K. (front cover)
317. Hu, J., Jaegers, N., Washton, N., Wang, Y., 2021, "High-field NMR Spectroscopy" in *Handbook of Advanced Catalyst Characterization*, page 20-25, Springer.
316. Zhang, J., J. Sun, and Y. Wang. 2021. "An overview of catalytic bio-oil upgrading. Part I: Processing aqueous-phase compounds." In *Handbook of Biodiesel and Petrodiesel Fuels: Science, Technology, Health, and Environment*. Volume 1. Biodiesel Fuels: Science, Technology, Health, and Environment, ed. O. Konur. Boca Raton, FL: CRC Press.
315. Zhang, J., J. Sun, and Y. Wang. 2021. "An overview of catalytic bio-oil upgrading. Part II: Processing oil-phase compounds and real bio-oil." In *Handbook of Biodiesel and Petrodiesel Fuels: Science, Technology, Health, and Environment*. Volume 1. Biodiesel Fuels: Science, Technology, Health, and Environment, ed. O. Konur. Boca Raton, FL: CRC Press.
314. L. Zhang, Y. Wang, Y. Yang, B. Zhang, S. Wang, J. Lin, S. Wan, Y. Wang, "Selective Hydrogenolysis of Aryl Ether Bond over Ru-Fe Bimetallic Catalyst", *Catal. Today*, 2020, <https://doi.org/10.1016/j.cattod.2020.04.030>.
313. S.A. Akhade, A. Winkelman, V.L. Dagle, L. Kovarik, S.F. Yuk, Mal. Lee, J. Zhang, A.B. Padmaperuma, Robert.A. Dagle, V. Glezakou, Y. Wang, R. Rousseau "Influence of Ag metal dispersion on the thermal conversion of ethanol to butadiene over Ag-ZrO<sub>2</sub>/SiO<sub>2</sub> catalysts", *J. Catal.*, 2020, DOI: 10.1016/j.jcat.2020.03.030.
312. W. Hu, Z. Chi, Y. Wan, S. Wang, J. Lin, S. Wan, Y. Wang, "Synergetic effect of Lewis acid and base in modified Sn-β on direct conversion of levoglucosan to lactic acid", *Catal. Sci. Tech.*, 2020, 10, 2986-2993.
311. L. Zhang, L. Zhang, Y. Chen, Y. Zheng, J. Guo, S. Wan, S. Wang, C. Ngaw, J. Lin, Y. Wang, "CdS/ZnO: A Multi-pronged Approach for Efficient Reduction of Carbon Dioxide under Visible Light Irradiation", *ACS Sus. Chem. Eng.*, 2020, 8, 13, 5270–5277.
310. N.R. Jaegers, Y. Wang, J. Hu, "Thermal perturbation of NMR properties in small polar and non-polar molecules", *Scientific Reports*, 2020, April 20. doi:10.1038/s41598-020-63174-6.
309. A. Hensley, G. Collinge, Y. Wang, J.S. McEwen, "Coverage Dependent Adsorption of Hydrogen on Fe(100): Determining Catalytically Relevant Surface Structures via Lattice Gas Models", *J. Phys. Chem. C*, 2020, doi:10.1021/acs.jpcc.9b11945. (cover)
308. F. Lin, Y. Chen, L. Zhang, D. Mei, L. Kovarik, B. Sudduth, H. Wang, F. Gao, Y. Wang, "Single-Facet Dominant Anatase TiO<sub>2</sub> (101) and (001) Model Catalysts to Elucidate the Active Sites for Alkanol Dehydration", *ACS Catalysis*, 2020, doi: 10.1021/acscatal.9b04654. (cover)
307. L. Du, V. Prabhakaran, X. Xie, S. Park, Y. Wang, Y. Shao, "Low-PGM and PGM-Free Catalysts for Proton Exchange Membrane Fuel Cells: Stability Challenges and Material Solutions", *Advanced Materials*, 2020, doi:10.1002/adma.201908232.
306. H. Li, J. Sun, G. Li, D. Wu, Y. Wang, "Real-time monitoring of surface acetone enolization and aldolization", *Catal. Sci. Tech.*, 2020, DOI: 10.1039/c9cy02339a. (back cover)
305. N.R. Jaegers, K.T. Mueller, Y. Wang, J. Hu, "Variable Temperature and Pressure Operando MAS NMR for Catalysis Science and Related Materials", *Accounts of Chemical Research*, 2020, <https://dx.doi.org/10.1021/acs.accounts.9b00557>.

304. J.Zhang, J.Sun, Y.Wang, "Recent advances in the selective catalytic hydrodeoxygenation of lignin-derived oxygenates to arenes", *Green Chemistry*, 2020, doi:10.1039/c9gc02762a.
303. K.Khivantsev, M.R.Jaegers, L.Kovarik, J.Hu, F.Gao, Y.Wang, J.Szanyi, "Palladium/zeolite low temperature passive NO<sub>x</sub> adsorbers (PNA); structure-adsorption property relationships for hydrothermally aged PNA materials", *Emisss.Control Sci.Technol.*, 2020, 6 (138), 126–138, <https://doi.org/10.1007/s40825-019-00139-w>.
302. C.B. Cockreham, X. Zhang, H.Li, E.Hammond-Pereira, J.Sun, S.R. Saunders, Y.Wang, H.Xu, D. Wu, "Inhibition of AlF<sub>3</sub>·3H<sub>2</sub>O Impurity Formation in Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene Synthesis under a Unique CoF<sub>x</sub>/HCl Etching Environment", *ACS Appl. Energy Mater.* 2019, 2, 11, 8145–8152.
301. Y.Wan, L.Zhang, J.Lin, W.Hu, J.Lin, S.Wan, Y.Wang, "One-pot synthesis of gluconic acid from biomass-derived levoglucosan using a Au/Cs<sub>2.5</sub>Ho<sub>0.5</sub>PW<sub>12</sub>O<sub>40</sub> catalyst", *Green Chemistry*, 2019, 21, 6318-6325.
300. X.Zhang, C.Liu, C.Ke, L.Liu, X.Hao, Y.Wu, S.Wan, S.Wang, Y.Wang, "Hydrothermally stable ZnAl<sub>2</sub>O<sub>4</sub> nanocrystals with controlled surface structures for design of longevity and highly active/selective PdZn Catalyst", *Green Chemistry*, 2019, 21(24) 6574-6578, doi:10.1039/C9GC02483B.
299. K.Khivantsev, N.R.Jaegers, I.Koleva, H.Aleksandrov, L.Kovarik, M.Engelhard, F.Gao, Y.Wang, G.Vayssilov, J.Szanyi, "Stabilization of Super Electrophilic Pd+2 Cations in Small-Pore SSZ-13 Zeolite", *J.Phys.Chem.C*, 2019, doi:10.102/acs.jpcc.9b06760.
298. B.Peng, K.G.Rappe, Y.Cui, F.Gao, J.Szanyi, M.J.Olszta, E.D.Walter, Y.Wang, J.Holladay, R.A.Goffe, "Enhancement of high-temperature selectivity on Cu-SSZ-13 towards NH<sub>3</sub>-SCR reaction from highly dispersed ZrO<sub>2</sub>", *Applied Catalysis B: Environmental*, 2019, DOI: 10.1016/j.apcatb.2019.118359.
297. N.Chaudhary, A.Hensley, G.Collinge, Y.Wang, J.S.McEwen, "Coverage-Dependent Adsorption of Phenol on Pt (111) from First Principles", *J.Phys.Chem.C*, 2019, doi:10.1021/acs.jpcc.9b07517.
296. N.R.Jaegers, K.Khivantsev, L.Kovarik, D.Klas, J.Hu, J.Szanyi, "Catalytic activation of ethylene C-H bonds on uniform d<sup>8</sup> Ir(I) and Ni(II) cations in zeolites: toward molecular level understanding of ethylene polymerization on heterogeneous catalysts", *Catal.Sci.Tech.*, 2019, 9(23) 6570-6576, doi: 10.1039/c9cy01442j.
295. Y.Cui, Y.Wang, D.Mei, E.D.Walter, N.M.Washton, J.D.Holladay, Y.Wang, J.Szanyi, C.H.F.Peden, F.Gao, "Revisiting effects of alkali metal and alkaline earth co-cation additives to Cu/SSZ-13 selective catalytic reduction catalysts", *J.Catal.*, 2019, 378, 363-375.
294. G.Li, X.Zhang, D.Qiu, Z.Liu, C.Yang, D.B.Cockreham, B.Wang, L.Fu, J.Zhang, B.Sudduth, X.Guo, H.Sun, Z.Huang, J.Qi, J.Sun, S.Ha, Y.Wang, D.Wu, "Tuning Ni/Al Ratio to Enhance Pseudocapacitive Charge Storage Properties of Nickel–Aluminum Layered Double Hydroxide", *Adv.Electron.Mater.*, 2019, 5, 1900215, doi: 10.1002/aelm.201900215.
293. A.Dahal, N.G.Petrick, Y.Wu, G.A.Kimmel, F.Gao, Y.Wang, Z.Dohnalek, "Adsorption and reaction of methanol on anatase TiO<sub>2</sub>(101) single crystals and faceted nanoparticles", *J.Phys.Chem.:C*, 2019, 123(39) 24133-24145, doi: 10.1021/acs.jpcc.9b07080.
292. N.R. Jaegers, J.Lai, Y.He, E.Walter, D.A. Dixon, M.Vasiliiu, Y.Chen, C.Wang, M.Y.Hu, K.T.Mueller, I.E. Wachs, Y.Wang, J.Hu, "Tungsten oxide-promotion mechanism for supported V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> catalysts during NO<sub>x</sub> abatement: structural effects revealed by <sup>51</sup>V MAS NMR", *Angew.Chem.Int.Ed.*, 2019, 58(36) 12609-12616, doi:10.1002/anie.201904503.
291. Y.Wan, C.Zheng, X.Lei, M.Zhuang, J.Lin, W.Hu, J.Lin, S.Wan, Y.Wang, "Oxidative esterification of acetol with methanol to methyl pyruvate over hydroxyapatite supported gold catalyst: essential roles of acid-base properties", *Chinese Journal of Catalysis*, 2019, 40(11) 1810-1819, doi:S1872-2067(19)63368-1.

290. F.Wang, J.C.Zhang, Z.Q.Chen, J.D.Lin, W.Z.Li, Y.Wang, B.H.Chen, "Water-saving dry methanation for direct conversion of syngas to synthetic natural gas over robust Ni<sub>0.1</sub>Mg<sub>0.9</sub>Al<sub>2</sub>O<sub>4</sub> catalyst", *J.Catal*, 2019, 375, 466-477, doi: 10.1016/j.jcat.2019.06.021.
289. J.Pang, J.Sun, M.Zheng, H.Li, Y.Wang, T.Zhang, "Transition metal carbide catalysts for biomass conversion: a review", *Appl.Catal.B: Environmental*, 2019, 254, 510-522, doi: 10.1016/j.apcatb.2019.05.034.
288. J.Zhou, C.Zhang, T.Niu, R.Huang, S.Li, J.Sun, Y.Wang, "Facile synthesis of reusable magnetic Fe/Fe<sub>3</sub>C/C composites from renewable resources for super-fast removal of organic dyes: characterization, mechanism and kinetics", *Powder Technology*, 2019, DOI: 10.1016/j.powtec.2019.04.016.
287. B.M.Wong, G.Collinge, A.J.R.Hensley, Y.Wang, J.S.McEwen, "Benchmarking the accuracy of coverage-dependent models: adsorption and desorption of benzene on Pt (111) and Pt<sub>3</sub>Sn (111) from first principles", *Progress in Surface Science*, 2019, DOI: 10.1016/j.progsurf.2019.04.001.
286. B.An, Y.Meng, Z. Li, Y.Hong, T.Wang, S.Wang, J.Lin, C.Wang, S.Wan, Y.Wang, W.Lin, "A pyrocarbonate intermediate for CO<sub>2</sub> activation and selective conversion in bifunctional metal-organic frameworks", *J.Catal.*, 2019, 373, 37-47, doi:10.1016/j.jcat.2019.03.008.
285. M.Wang, N.Jaegers, M.S.Lee, C.Wan, J.Hu, H.Shi, D.Mei, S.Burton, D.Camaioni, O.Gutierrez, V.Glexakou, R.Rousseau, Y.Wang, J.Lercher, "Genesis and stability of hydronium ions in zeolite channels", *J.Am.Chem.Soc.*, 2019, doi:10.1021/jacs.8b07969.
284. X.Isidro Pereira-Hernández, A.DeLaRiva, V.Muravev, D.Kunwar, H.Xiong, B.Sudduth, M.Engelhard, L.Kovarik, E.J.M. Hensen, Y.Wang, A.K.Datye, "Tailoring the activity of Pt/CeO<sub>2</sub> catalysts via high-temperature vapor-phase synthesis", *Nature Comm.*, 2019, doi:10.1038/s41467-019-09308-5.
283. A.Wang, Y.Chen, E.D.Walter, N.M.Washton, D.Mei, T.Varga, Y.L.Wang, J.Szanyi, Y.Wang, C.H.F.Peden, F.Gao, "Unraveling the mysterious failure of Cu/SAPO-34 selective catalytic reduction (SCR) catalysts", *Nature Comm.*, 2019, doi:10.1038/s41467-019-09021-3.
282. J.Tian, J.Tan, M.Xu, Z.Zhang, S.Wan, S.Wang, J.Lin, Y.Wang, "Propane oxidative dehydrogenation over highly selective hexagonal boron nitride catalysts: the role of oxidative coupling of methyl", *Science Advances*, 2019, doi: 10.1126/sciadv.aav8063.
281. D.Kunwar, S.Zhou, A.DeLaRiva, E.J. Peterson, H.Xiong, X.I.P.Hernández, S.C.Purdy, R.ter Veen, H.H.Brongersma, J.T.Miller, H.Hashiguchi, L.Kovarik, S.Lin, H.Guo, Y.Wang, A.K. Datye, "Stabilizing High Metal Loadings of Thermally Stable Platinum Single Atoms on an Industrial Catalyst Support", *ACS Catal*, 2019, doi: 10.1021/acscatal.8b04885.
280. Y.Cui, Y.L.Wang, E.D.Walter, J.Szanyi, Y.Wang, F.Gao, "Influences of Na<sup>+</sup> co-cation on the structure and performance of Cu/SSZ-13 selective catalytic reduction catalysts", *Catal.Today*, 2019, <https://doi.org/10.1016/j.cattod.2019.02.037>.
279. A.J.R.Hensley, Y.Wang, J.S.McEwen, "The Partial Reduction of Clean and Doped α-Fe<sub>2</sub>O<sub>3</sub>(0001) from First Principles", *Appl.Catal.A:General*, 2019, <https://doi.org/10.1016/j.apcata.2019.02.019>
278. H.Li, J.Sun, Y.Wang, "Surface acetone reactions on Zn<sub>x</sub>Zr<sub>y</sub>O<sub>z</sub>: a DRIFTS-MS study", *Appl.Catal.A: General*, 2019, 573 (SI), 22-31, doi: 10.1016/j.apcata.2019.01.007.
277. K.Khivantsev, N.Jaeger, L.Kovarik, J.Hanson, F.Tao, Y.Tang, X.Zhang, I.Z.Koleva, H.A.Aleksandrov, G.N.Vayssilov, Y.Wang, F.Gao, J.Szanyi, "Achieving Atomic Dispersion of Highly Loaded Transition Metals in Small-Pore Zeolite SSZ-13: High-Capacity and High-Efficiency Low-Temperature CO and Passive NO<sub>x</sub> Adsorbers", *Angewandte Chemie Int.Ed.*, 2018, doi:10.1002/anie.201809343.

276. J.Zhang, J.Sun, B.Sudduth, Y.Wang, "Liquid-phase hydrodeoxygenation of lignin-derived phenolics on Pd/Fe: A mechanistic study", *Catal.Today*, 2018, doi:10.1016/j.cattod.2018.12.027.
275. T.Li, S.Ong, J.Zhang, C.Jia, J.Sun, Y.Wang, H.Lin, "One-pot conversion of carbohydrates into furan derivatives in biphasic tandem catalytic process", *Catal.Today*, 2018, doi.org/10.1016/j.cattod.2018.11.052.
274. K.Khivantsev, N.R.Jaegers, L.Kovarik, S.Prodinger, M.A.Derwinski, Y.Wang, F.Gao, J.Szanyi, "Palladium/Beta zeolite passive NO<sub>x</sub> adsorbers (PNA): Clarification of PNA chemistry and the effects of CO and zeolite crystallite size on PNA performance", *Appl.Catal.A:General*, 2019, 569, 141-148, <https://doi.org/10.1016/j.apcata.2018.10.021>.
273. D.Mei, F.Gao, J.Szanyi, Y.Wang, "Mechanistic insight into the passive NO<sub>x</sub> adsorption in the highly dispersed Pd/HBEA zeolite", *Appl.Catal.A: General*, 2019, 569, 181-189, <https://doi.org/10.1016/j.apcata.2018.10.037>.
272. K.Khivantsev, F.Gao, L.Kovarik, Y.Wang, J.Szanyi, "Molecular Level Understanding of How Oxygen and Carbon Monoxide Improve NO<sub>x</sub> Storage in Palladium/SSZ-13 Passive NO<sub>x</sub> Adsorbers: The Role of NO<sup>+</sup> and Pd(II)(CO)(NO) Species", *J.Phys.Chem C*, 2018, 122(20), 10820-10827, doi: 10.1021/acs.jpcc.8b01007.
271. Q.Dong, M.Wu, D.Mei.Y.Shao, Y.Wang, J.Liu, H.Li, L.Hong, "Multifunctional Pd-Sn electrocatalysts enabled by in situ formed SnO<sub>x</sub> and TiC triple junctions", *Nano Energy*, 2018, 53, 940-948, doi: 10.1016/j.nanoen.2018.08.060.
- 270 Y.Yang, J.Chen, L.Zhang, M.Tan, J.Lin, S.Wan, S.Wang, Y.Wang, "Enhanced Antioxidation Stability of Iron-Based Catalysts via Surface Decoration with ppm Platinum", *ACS Sustainable Chem.Eng.*, 2018, DOI: 10.1021/acssuschemeng.8b02505.
- 269.Y.Zha, M.Cunningham, Y.Tang, A.Srinivasan, J.Luo, J.Heichelbech, V.Lakkireddy, A.Yezerets, S.Ruffin, Z.Weil, J.Fedeyko, B.Sukumar, H.Hess, F.Gao, J.Szanyi, Y.Wang, "Sustained Low Temperature NO<sub>x</sub> Reduction", *SAE Technical Paper 2018-01-0341*, 2018, <https://doi.org/10.4271/2018-01-0341>.
268. Y.Feng, Q.Wan, H.Xiong, S. Zhou, X.Chen, X.Hernandez, Y.Wang, S.Lin, A.K. Datye, H.Guo, "Correlating DFT Calculations with CO Oxidation Reactivity on Ga Doped Pt/CeO<sub>2</sub> Single-Atom Catalysts", *J.Phys.Chem.C*, 2018, 122(39), 22460-22468, DOI:10.1021/acs.jpcc.8b05815 #
267. A.Datye, Y.Wang, "Atom trapping: a novel approach to generate thermally stable and regenerable single atom catalysts", *National Science Review*, 2018, doi.org/10.1093/nsr/nwy093.
266. J.S.Tian, J.H.Lin, M.L.Xu, S.L.Wan, J.D.Lin, Y.Wang, "Hexagonal boron nitride catalyst in a fixed-bed reactor for exothermic propane oxidation dehydrogenation", *Chem.Eng.Sci*, 2018, 186 142-151; 10.1016/j.ces.2018.04.029 AUG 31 2018.
265. M.Lu, J.Zhang, Y.Yao, J.Sun, Y.Wang, H.Lin, "Renewable energy storage via efficient reversible hydrogenation of piperidine captured CO<sub>2</sub>", *Green Chemistry*, 2018, doi: 10.1039/C8GC00954F.
264. J.H.Lin, J.S.Tian, X.J.Cheng, J.Q.Tan, S.L.Wan, J.D.Lin, Y.Wang, "Propane ammoxidation over MoVTeNb oxide catalyst in a microchannel reactor", *AIChE J.*, 2018, doi 10.1002/aic.16377.
263. C.Miao, O.Marin-Flores, T.Dong, D.Gao, Y.Wang, M.Garcia-Pérez, S.Chen, "Hydrothermal Catalytic Deoxygenation of Fatty Acid and Bio-oil with In Situ H<sub>2</sub>", *ACS Sustainable Chem.Eng.*, 2018, 6(4), 4521-4530.

262. S.Lyu, L. Wang, J.Zhang, C.Liu, J.Sun, B.Peng, Y.Wang, K.G. Rappé, Y.Zhang, J.Li, L.Nie, "Role of Active Phase in Fischer–Tropsch Synthesis: Experimental Evidence of CO Activation over Single-Phase Cobalt Catalysts", *ACS Catal*, 2018, 8(9), 7787-7798, DOI: 10.1021/acscatal.8b00834.
261. L.Du, Y.Shao, J.Sun, G.Yin, C.Du, Y.Wang, "Electrocatalytic valorization of biomass derived chemicals", *Catal.Sci.Technol.*, 2018, 8(13), 3216-3232, doi:10.1039/c8cy00533h.
260. A.Wang, Y.Wang, E.Walter, R.K.Kukkadapu, Y.Guo, G.Lu, R.S.Weber, Y.Wang, C.H.F.Peden, F.Gao, "Catalytic N<sub>2</sub>O decomposition and reduction by NH<sub>3</sub> over Fe/Beta and Fe/SSZ-13 catalysts", *J.Catal.*, 2018, 358, 199-210, <https://doi.org/10.1016/j.jcat.2017.12.011>.
259. R.A.L.Baylon, J.Sun, L.Korarik, M.Engelhard, H.Li, A.D.Winkelman, Y.Wang, "Structural identification of Zn<sub>x</sub>Zr<sub>y</sub>O<sub>z</sub> catalysts for cascade aldoliation and self-deoxygenation reactions", *Appl.Catal.B: Environmental*, 2018, 234, 337-347, doi:<https://doi.org/10.1016/j.apcatb.2018.04.051>.
258. J.Bray, G.Collinge, C.Stampfl, Y.Wang, J.S.McEwen, "Predicting the electric field effect on the lateral interactions between adsorbates: O/Fe(100) from the first principles", *Topics in Catalysis*, 2018, <https://doi.org/10.1007/s11244-018-0944-z>.
257. J.Bray, A.J.R.Hensley, G.Collinge, F.Che, Y.Wang, J.S.McEwen, "Modeling of the adsorbate coverage distribution over a multi-faceted catalytic grain in the presence of an electric field: O/Fe from first principles", *Catal.Today*, 2018, 312, 92-104, doi:10.1016/j.cattody.2018.04.016.
256. D.Shi, H.Wang, L.Kovarik, F.Gao, C.Wan, J.Hu, Yong Wang, "WO<sub>x</sub> supported on γ-Al<sub>2</sub>O<sub>3</sub> with different morphologies as model catalysts for alkanol dehydration", *J.Catal.*, 2018, <https://doi.org/10.1016/j.jcat.2018.04.004>.
255. J.Tian, J.Lin, M.Xu, S.Wan, J.Lin, Y.Wang, "Hexagonal boron nitride catalyst in a fixed-bed reactor for exothermic propane oxidation dehydrogenation", *Chem.Eng.Sci.*, 2018, <https://doi.org/10.1016/j.ces.2018.04.029>.
254. D.Yun, Y.Wang, J.E.Herrera, "Ethanol partial oxidation over VO<sub>x</sub>/TiO<sub>2</sub> catalysts: the role of titania surface oxygen on the vanadia reoxidation in the Mars-van Krevelen mechanism", *ACS Catalysis*, 2018, DOI: 10.1021/acscatal.7b03327.
253. N.Yu, M.MRahman, J.Chen, J.Sun, M.Engelhard, X.I.P.Hernandez, Y.Wang, "Steam reforming of simulated bio-oil on K-Ni-Cu-Mg-Ce-O/Al<sub>2</sub>O<sub>3</sub>: The effect of K", *Catal.Today*, 2019, 323, 183-190, doi:<https://doi.org/10.1016/j.cattod.2018.04.010>.
252. A.J.R.Hensley, J.Zhang, I.Vincon, X.P.Hernandez, D.Tranca, G.Seifert, J.S.McEwen, Y.Wang, "Mechanistic understanding of methanol carbonylation: interfacing homogeneous and heterogeneous catalysis via carbon supported Ir-La", *J.Catal.*, 2018, <https://doi.org/10.1016/j.jcat.2018.02.022>.
251. F.Wang, W.Li, J.D.Lin, Z.Chen, Y.Wang, "Crucial support effect on the durability of Pt/MgAl<sub>2</sub>O<sub>4</sub> for partial oxidation of methane to syngas", *Appl.Catal.B: Environmental*, 2018, doi:<https://doi.org/10.1016/j.apcatb.2018.03.018>
250. A.J.R.Hensley, Y.Wang, D.Mei, and J.S.McEwen, "Mechanistic Effects of Water on the Fe-Catalyzed Hydrodeoxygenation of Phenol. The Role of Brønsted Acid Sites", *ACS Catalysis*, 2018, doi: 10.1021/acscatal.7b02576.
249. L.Nie, D.Mei, H.Xiong, B.Peng, Z.Ren, X.Hernandez, A.DeLaRiva, M.Wang, M.H. Engelhard, L. Kovarik, A.K. Datye, Y.Wang, "Activation of surface lattice oxygen in single-atom Pt/CeO<sub>2</sub> for low-temperature CO oxidation", *Science*, 2017, 358, 1419-1423, DOI: 10.1126/science.aao2109.

248. A.J. R. Hensley, C.Wöckel, C.Gleichweit, K.Gotterbarm, C.Papp,H.Steinrück, Y.Wang, R.Denecke, and J.S.McEwen, "Identifying the Thermal Decomposition Mechanism of Guaiacol on Pt(111): An Integrated X-ray Photoelectron Spectroscopy and Density Functional Theory Study", **J.Phys.Chem.C.**, 2017, DOI: 10.1021/acs.jpcc.7b10006.
247. C. Carrillo, H.F. Xiong, A.T DeLaRiva, D. Kunwar, E.J. Peterson, S.R. Challa, G.S. Qi, S. Oh, M.H.Wiebenga, X.I.P. Hernandez, Y. Wang, A.K. Datye, "Designing Catalysts for Meeting the DOE 150° Challenge for Exhaust Emissions", **Microsc. Microanal.**, 2017, 23, 2028-2029, DOI: 10.1017/S1431927617010807.
246. L.Zhang, G.Kong, H.Yang, L.Zhang, S.Wan, J.Lin, and Y.Wang, "Direct coupling of thermo- and photo-catalytic conversion of CO<sub>2</sub>-H<sub>2</sub>O to fuels", **ChemSusChem**, 2017, doi: 10.1002/cssc.201701472R1.
245. J.Song, Y.Wang, E.D. Walter, N.M. Washton, D.Mei, L.Kovarik, M.H. Engelhard, S.Prodinger, Y.Wang, C.H. F. Peden, and F.Gao, "Toward Rational Design of Cu/SSZ-13 Selective Catalytic Reduction Catalysts: Implications from Atomic-Level Understanding of Hydrothermal Stability", **ACS Catal.**, 2017, 7, 8214-8227.
244. L.Du ,L.Luo, Z.Feng, M.H.Engelhard, X.Xie, B.Han, J.Sun, J.Zhang, G.Yin, C.Wang, Y.Wang, Y.Shao, "Nitrogen-doped graphitized carbon shell encapsulated NiFe nanoparticles: A highly durable oxygen evolution catalyst", **Nano Energy**, 2017, 39:245-252. 10.1016/j.nanoen.2017.07.006.
243. J.Zhang, B.An,Y.Hong,Y.Meng, X.Hu, C.Wang,J.Lin, W.Lin and Y.Wang, "Pyrolysis of metal-organic frameworks to hierarchical porous Cu/Zn-nanoparticle@carbon materials for efficient CO<sub>2</sub> hydrogenation", **Materials Chemistry Frontiers**, 2017, doi: 10.1039/C7QM00328E.
242. W.Hu,Y.Wan, L.Zhu, X.Cheng, S.Wan, J.Lin, and Y.Wang, "A Strategy for Simultaneous Synthesis of Methallyl Alcohol and Diethyl Acetal with Sn-β", **ChemSusChem**, 2017, doi: 10.1002/cssc.201701435.
241. N.Jaeger, Y.Wang, J.Hu, "Development and application of in-situ high temperature, high pressure magic-angle spinning NMR", in Modern Magnetic Resonance, 2<sup>nd</sup> Ed., 2017.
240. Y.Wan, M.Zhuang, S.Chen, W.Hu, J.Sun, J.Lin, S.Wan, Y.Wang, "One-pot production of lactic acid from acetol over dealuminated Sn-beta supported gold catalyst", **ACS Catalysis**, 2017, doi:10.1021/acscatal.7b01499.
239. Y.Zheng, L.Kovarik, M.H.Engelhard, Y.Wang, Y.Wang, F.Gao, and J.Szanyi, "Low-temperature Pd/zeolite passive NO<sub>x</sub> adsorbers: structure, performance, and adsorption chemistry", **J.Phys.Chem.C**, 2017, doi:10.1021/acs.jpcc.7b04312.
238. J.Tian, Y.Ke, G.Kong, M.Tan, Y.Wang, J.Lin, W.Zhou, S.Wan, "A novel structured PdZnAl/C fiber catalyst for methanol steam reforming in microreactor", **Renewable Energy**, 2017, 113, 30-42.
237. B.Lin, Y.Guo, J.Lin, J.Ni, J.Lin, L.Jiang, Y.Wang, "Deactivation study of carbon-supported ruthenium catalyst with potassium promoter", **Appl.Catal.A: General**, 2017, 541, 1-7, doi: 10.1016/j.apcata.2017.04.020.
236. X.Wang, Z.Lan, Y.Liu, Y.Luo, J.Chen, L.Jiang, Y.Wang, "Facile fabrication of hollow tubular mixed oxides for selective catalytic reduction of NO<sub>x</sub> at low temperature: a combined experimental and theoretical study", **Chem.Comm.**, 2017, 53, 967-970.
235. Y.Hong, Y.Wang, "Elucidation of reaction mechanism for m-cresol hydrodeoxygenation over Fe based catalysts: A kinetic study", **Catal.Comm.**, 2017, doi: 10.1016/j.catcom.2017.06.028.
234. Y.Hong, S.Zhang, F.Tao, Y.Wang, "Stabilization of iron-based catalysts against oxidation: an in situ ambient pressure XPS study", **ACS Catalysis**, 2017, doi: 10.1021/acscatal.7b00636.



233. J.Chen, J.Sun, Y.Wang, "Catalysts for steam reforming of bio-oil: a review", **Ind.Eng.Chem.Res.**, 2017, doi:10.102/acs.iecr.7b00600.
232. F.Bossola, X.I.Pereira-Hernandez, C.Evangelisti, Y.Wang, and V.Dal Santo, "Investigation of the promoting effect of Mn on a Pt/C catalyst for the steam and aqueous phase reforming of glycerol", **J.Catal**, 2017, doi:10.106/j.jcat.2017.03.002.
231. N.R.Jaegers, C.Wan, M.Y.Hu, M.Y.Hu, M.Vailiu, D.A.Dixon, E.Walter, I.E.Wachs, Y.Wang, J.Hu, "Investigation of silica-supported vanadium oxide catalysts by high field  $^{51}\text{V}$  magic-angle spinning NMR", **J.Phys.Chem.C**, 2017, doi:10.1021/acs.jpcc.7b01658.
230. W.Li, L.Nie, Y.Chen, L.Korarik, J.Liu, Y.Wang, "Surface enrichment of Pt in stable Pt-Ir nano-alloy particles on  $\text{MgAl}_2\text{O}_4$  spinel in oxidizing atmosphere", **Catal.Comm.**, 2017, DOI: 10.1016/j.catcom.2017.01.012.
229. W.Li, L.Kovarik, Y.Cheng, L.Nie, M.Bowden, J.Liu, Y.Wang, "Sabilization and transformation of Pt nanocrystals supported on  $\text{ZnAl}_2\text{O}_4$  spinel", **RSC Advances**, 2017, DOI: 10.1039/c6ra26159k.
228. L.Du, C.Du, G.Chen, F.Kong, G.Yin, Y.Wang, "Metal-organic coordination newworks: Prussian Blue and its synergy with Pt Nanoparticles to enhance oxygen reduction kinetics", **ACS Appl. Mater. Interfaces**, 2016, 8(24), 15250-15257.
227. Prodinge, S., Derewinski, M.A., Wang, Y., Washton, N.M., Szanyi, J., Gao, F., Wang, Y., Peden, H.F.C., "Sub-micron Cu/SSZ-13: synthesis and application as selective catalytic reduction (SRC) catalysts", **Applied Catalysis B, Environmental**, 2017, 201, 461-469, DOI: 10.1016/j.apcatb.2016.08.053.
226. C.Wan, M.Y.Hu, N.R.Jaegers, D.Shi, H.Wang, F.Gao, Z.Qin, Y.Wang, J.Hu, "Investigating the Surface Structure of  $\gamma\text{-Al}_2\text{O}_3$  Supported  $\text{WO}_x$  Catalysts by High Field  $^{27}\text{Al}$  MAS NMR and Electronic Structure Calculations", **J.Phys.Chem.C**, 2016, DOI: 10.1021/acs.jpcc.6b09060.
225. Q.Cai, J.Wang, Y.Wang, D.Mei, "First-Principles Thermodynamics Study of Spinel  $\text{MgAl}_2\text{O}_4$  Surface Stability", **J.Phys.Chem.C**, 2016, 120, 19087-19096.
224. J.Sun, Q.Cai, Y.Wan, S.Wan, L.Wang, J.Lin, D.Mei, Y.Wang, "Promotional effects of cesium promoter on higher alcohol synthesis from syngas over cesium-promoted  $\text{Cu/ZnO/Al}_2\text{O}_3$  catalysts", **ACS Catalysis**, 2016, 6, 5771-5785.
223. S.Park, Y.Shao, V.V.Viswanathan, J.Liu, Y.Wang, "Electrochemical study of highly durable cathode with Pt supported on ITO-CNT composite for proton exchange membrane fuel cells", **Journal of Industrial and Engineering Chemistry**, 2016, doi: dx.doi.org/10.1016/j.jiec.2016.07.039.
222. J.Jones, H.Xiong, A.T. DeLaRiva, E.J. Peterson, H.Pharm, S.R. Challa, G.Qi, S.Oh, M.H. Wiebenga, X.Hernández, Y.Wang, A.K. Datye, "Thermally stable single-atom platinum-on-ceria catalysts via atomtrapping", **Science**, 2016, 353(6295), 150-154.
221. M.Pruski, A.D. Sadow, I. I. Slowing, C. L. Marshall, P.Stair, J.Rodriguez, A. Harris, G. A. Somorjai, J.Biener, C. Matranga, C.Wang, J. A. Schaidle, G.T. Beckham, D.A. Ruddy, T.Deutsch, S.M. Alia, C.Narula, S.Overbury, T.Toops, R. M.Bullock, C.H. F. Peden, Y.Wang\*, M.D. Allendorf, J.Nørskov, T.Bligaard, Preface of Virtual Special Issue on Catalysis at the U.S. Department of Energy's National Laboratories, **ACS Catalysis**, 2016, 3227-3235, DOI: 10.1021/acscatal.6b00823.
220. J.Sun, S.Wan, J. Lin, Y.Wang, "Recent advances in catalytic conversion of syngas to ethanol and higher alcohols", Chapter 8 in *Petrochemical Catalyst Materials, Processes, and Emerging Technologies*, eds. Hamid Al-Megren and Tiancun Xiao. ISBN13: 9781466699755. Feb. 2016.
219. Lei Du, Yuyan Shao, Junming Sun, Geping Yin, Jun Liu, Yong Wang "Advanced catalyst supports for PEM fuel cell cathodes" **Nano Energy**, 2016, doi:10.1016/j.nanoen.2016.03.016.

218. W.Wang, K.Wu, P.Liu, L.Li, Y.Yang, Y.Wang, "Hydrodeoxygenation of p-Cresol over Pt/Al<sub>2</sub>O<sub>3</sub> Catalyst Promoted by ZrO<sub>2</sub>, CeO<sub>2</sub>, and CeO<sub>2</sub>-ZrO<sub>2</sub>", *Ind.Eng.Chem.Res.*, 2016, DOI:10.1021/acs.iecr.6b00515.
217. R.A.L.Baylon, J.Sun, K.J.Martin, P.Venkitasubramanian, Y.Wang, "Beyond ketonization: selective conversion of carboxylic acids to olefins over balanced Lewis acid-base pairs", *Chem.Comm.*, 2016, doi:10.1039/c5cc10528e. (featured as the back outside cover)
216. Y.Hong and Y.Wang, "Perspective on pyrolysis of biomass: essential roles of Fe based bimetallic catalysts", *Catal.Lett.* 2016, DOI:10.1007/s10562-016-1770-1 (invited perspective).
215. J.Hu, S.Xu, J.Kwak, M.Hu, C.Wan, Z.Zhao, S.Janos, X.Bao, X.Han, Y.Wang, C.H.F.Peden, "High field <sup>27</sup>Al MAS NMR and TPD studies of active sites in ethanol dehydration using thermally treated transitional aluminas as catalysts", *J.Catal.*, 2016, 336, 85-93.
214. J.Sun, R.A.L.Baylon, C.Liu, D.Mei, K.J.Martin, P.Venkitasubramanian, Y.Wang, "Key roles of Lewis acid-base pairs on Zn<sub>x</sub>Zr<sub>y</sub>O<sub>z</sub> in direct ethanol/acetone to isobutene conversion", *J.Am.Chem.Soc.*, 2016, 2, 507-517.
213. K.K. Ramasamy, M.Gray, H.Job, C.Smith, Y.Wang, "Tunable Catalytic Properties of Mgo-Al<sub>2</sub>O<sub>3</sub> in Ethanol Conversion to High Value Compounds" *Catalysis Today*, 2016, 269, 82-87.
212. C.Miao, O.Marin-Flores, S.Davidson, T.Li, D.Tao, D.Gao, Y.Wang, M.Garcia-Perez, S.Chen, "Hydrothermal catalytic deoxygenation of palmitic acid over nickel catalyst", *Fuel*, 2016, 166(15): 302-308.
211. Y.Shao, Y.Cheng, W.Duan, W.Wang, Y.Lin, Y.Wang\*, J.Liu\*, "Nanostructured electrocatalysts for PEM fuel cells and redox flow batteries: a selected review", *ACS Catalysis*, 2015, doi:10.1021/acscatal.5b01737.
210. C.Liu, J.Sun, H.M.Brown, O.G.Marin-Flores, T.Bays, A.M.Karim, Y.Wang, "Aqueous phase hydrodeoxygenation of polyols over Pd/WO<sub>3</sub>-ZrO<sub>2</sub>: role of Pd-WO<sub>3</sub> interaction and hydrodeoxygenation pathway", *CatalysisToday*, 2015, doi:10.1016/j.cattod.2015.10.034.
209. A.Hensley, Y.Wang, J.S.McEwen, "Adsorption of Guaiacol on Fe (110) and Pd (111) from First Principles", *Surface Science*, 2015, doi:10.1016/j.susc.2015.10.030.
208. Z.Weil, A.Karim, Y.Wang, "Elucidation of the roles of Re in aqueous-phase reforming of glycerol over Pt-Re/C catalysts", *ACS Catalysis*, 2015, doi: 10.1021/acscatal.5b01770.
207. S.Davidson, J.Sun, Y.Wang, "The effect of ZnO addition on H<sub>2</sub>O activation over Co/ZrO<sub>2</sub> catalysts", *Catal.Today*, 2015, doi: 10.1016/j.cattod.2015.10.016.
206. H.Wang, Y.Wang, "Characterization of deactivated bio-oil hydrotreating catalysts", *Topics in Catalysis*, 2015, doi:10.1007/s11244-015-0506-6.
205. K.K.Ramasamy, M.Gray, H.Job, D.Santosa, S.X.Li, A.Devaraj, A.Karkamkar, Y.Wang, "Role of calcination temperature on the hydrotalcite derived MgO-Al<sub>2</sub>O<sub>3</sub> in converting ethanol to butanol", *Topics in Catalysis*, 2015. DOI: 10.1007/s11244-015-0504-8.
204. Z.Fang, Y.Wang, D.A.Dixon, "Computational Study of Ethanol Conversion on Al<sub>8</sub>O<sub>12</sub> as a Model for γ-Al<sub>2</sub>O<sub>3</sub>", *J.Phys.Chem:C*, 2015, 119:23413-23421, doi:10.1021/acs.jpcc.5b05887.
203. J.Sun, A.Karim, X.Li, Y.Shin, Y.Wang, "Hierarchically structured catalysts for cascade and selective steam reforming/Hydrodeoxygenation reactions", *Chem.Comm*, 2015, doi:10.1039/C5CC07244A (selected as the back cover).
202. M.M.Rahman, S.Davidson, J.Sun, Y.Wang, "Effect of water on ethanol conversion over ZnO", *Topics in Catalysis*, 2015, doi:10.1007/s11244-015-0503-9.
201. J.Sun, S.Wan, F.Wang, J.Lin, Y.Wang, "Selective synthesis of methanol and higher alcohols over Cs/Cu/ZnO/Al<sub>2</sub>O<sub>3</sub> catalysts", *Ind.Eng.Chem.Res.*, 2015, doi:10.1021/acs.iecr.5b01927.

200. H.Zhang, J.Sun, C.Liu, Y.Wang, "Distinct water activation on polar/non-polar facets of ZnO nanoparticles", *J.Catal*, 2015, doi: 10.1016/j.jcat.2015.08.016.
199. A.Hensley, S.Schneider, Y.Wang, J.S.McEwen, "Adsorption of aromatics on the (111) surface of PtM and PtM<sub>3</sub> (M=Ni, Fe) alloys", *RSC Advances*, 2015, doi:10.1039/c5ra13578h.
198. Z.Chase, A.Vjunov, J.L.Fulton, D.M.Camaioni, M.Balasubramanian, Y.Wang, J.A.Lercher, "State of supported Ni nanoparticles during catalysis in aqueous media", *Chemistry-A European Journal*, 2015, doi:10.1002/chem.201502723.
197. Y.Ning, J.Sun, Y.Wang, "The effects of ZnO facets on ethanol steam reforming on Co/ZnO", *Catal.Comm.* 2015, doi:10.1016/j.catcom.2015.10.018.
196. W.Li, F.Gao, Y.Li, J.Liu, C.H.F.Peden, Y.Wang, "Nanocrystalline anatase titania supported vanadia catalysts: facet-dependent structure of vanadia", *J.Phys.Chem C*, 2015, DOI:10.1021/acs.jpcc.5b01486.
195. J.Sun, H.Zhang, Y.Ning, S.Davideson, Y.Wang, "Effect of cobalt particle size on acetone steam reforming", *ChemCatChem*, 2015, DOI: 10.1002/cctc.201500336.
194. R.A.L.Baylon, J.Sun, Y.Wang, "Conversion of ethanol to 1,3-butadiene over Na doped Zn<sub>x</sub>Zr<sub>y</sub>O<sub>z</sub> mixed metal oxides", *Catalysis Today*, 2015, doi: 10.1016/j.cattod.2015.04.010.
193. J.Hu, S.Xu, W.Li, M.Hu, X.Deng, D.Dixon, M.Vasiliu, R.Craciun, Y.Wang, X.Bao, C.H.F.Peden, "Investigation of the structure and active sites of TiO<sub>2</sub> nano-ro supported VO<sub>x</sub> catalysts by high field and fast spinning <sup>51</sup>V MSA NMR", *ACS Catalysis*, 2015, doi:10.1021/acscatal.5b00286.
192. K.K.Ramasamy, M.Gray, H.Job, Y.Wang, "Direct syngas hydrogenation over a Co-Ni bimetallic catalyst: process parameter optimization", *Chem.Eng.Sci.*, 2015, doi:10.1016/j.ces.2015.03.064.
191. Y.Li, Z.Weil, F.Gao, L.Korarik, R.Long, C.H.F.Peden, Y.Wang, "Effect of oxygen defects on the catalytic performance of VO<sub>x</sub>/CeO<sub>2</sub> catalysts for oxidative dehydrogenation of methanol", *ACS Catalysis*, 2015, DOI 10.1021/cs502084g.
190. J.D.Holladay, Y.Wang, "3-D model of a radial flow sub-watt methanol fuel processor", *Chem.Eng.Sci.*, 2015, 10.1016/j.ces.2015.02.012.
189. J.D.Holladay, Y.Wang, "A review of recent advances in numerical simulations of microscale fuel processor for hydrogen production", *Journal of Power Sources*, 2015, <http://dx.doi.org/10.1016/j.jpowsour.2015.01.079>.
188. Y.Shao, N.Rjput, J.Hu, M.Hu, T.Liu, Z.Weil, M.Gu, X.Deng, S.Xu, K.S.Han, J.Wang, Z.Nie, G.Li, K.R.Zavadil, J.Xiao, C.Wang, W.A.Henderson, J.G.Zhang, Y.Wang, K.T.Mueller, K.Persson, J.Liu, "Nanocomposite polymer electrolyte for rechargeable magnesium batteries", *Nano Energy*, 2014, doi:10.1016/j.nanoen.2014.12.028.
187. A.J.R.Hensley, Y.Wang, J.S.McEwen, "Phenol deoxygenation mechanisms on Fe(110) and Pd(111)", *ACS Catalysis*, 2014, DOI: 10.1021/cs501403w.
186. Z.Weil, A.Karim, Y.Li, D.L.King, Y.Wang, "Elucidation of the roles of Re in steam reforming of glycerol over Pt-Re/C catalysts", *J.Catal.*, 2014, doi:10.1016/j.jcat.2014.11.006. (editor's choice)
185. V.M.Dagle, R.A.Dagle., J.Li, C.Deshmane, D.E.Taylor, X.Bao, Y.Wang, "Direct conversion of syngas-tohydrocarbons over higher alcohols synthesis catalysts mixed with HZSM-5", *Ind.Eng.Chem.Res.*, 2014, 53 (36), pp 13928-13934.
184. A.J.Hensley, Y.Wang, J.S.McEwn, "Adsorption of Phenol on Fe (110) and Pd (111) from First Principles", *Surface Science*, doi: 10.1016/j.susc.2014.08.003.

183. W.Li, L.Kovarik, D.Mei, M.H.Engelhard, F.Gao, J.Liu\*, Y.Wang\*, C.H.F.Peden\*, "A general mechanism for stabilizing the small sizes of precious metal nanoparticles on oxide supports", **Chemistry of Materials**, 2014, doi: dx.doi.org/10.1021/cm5013203.
182. J.Sun, A.Karim, D.Mei, M.Engelhard, X.Bao, Y.Wang, "New insight into reaction mechanism of ethanol steam reforming on Co-ZrO<sub>2</sub>", **Appl.Catal.B: Environmental**, 2014, doi:10.1016/j.apcatb.2014.06.043
181. A.J.R.Hensley, Y.Hong, R.Zhang, H.Zhang, J.Sun, Y.Wang\*, J.S.McEwen\*, "Enhanced Fe<sub>2</sub>O<sub>3</sub> reducibility via surface modification with Pd: characterizing the synergy within Pd/Fe catalysts for hydrodeoxygenation reactions", **ACS Catalysis**, 2014, doi: dx.doi.org/10.1021/cs500565e.
180. Y.Hong, H.Zhang, J.Sun, A.M.Karim, A.J.R.Henley, M.Gu, M.H.Engelhard, J.S.McEwen, Y.Wang, "Synergistic catalysis between Pd and Fe in gas phase hydrodeoxygenation of m-cresol", **ACS Catalysis**, 2014, doi: dx.doi.org/10.1021/cs500578g (cover of the Oct issue).
179. H.Zhang, J.Sun, V.L.Dagle, B.Halevi, A.Datye, Y.Wang, "The influence of ZnO facets on Pd/ZnO catalysts for methanol steam reforming", **ACS Catalysis**, 2014, 4, 2379-2386, doi: dx.doi.org/10.1021/cs500590t.
178. H.Xiong, A.Riva, Y.Wang, A.Datye, "Low-temperature aqueous-phase reforming of ethanol for CO-free H<sub>2</sub> production on bimetallic PdZn catalyst", **Catalysis Science & Technology**, 2014, doi: 10.1039/c4cy00914b.
177. A.K.Dalai, Y.Wang, Preface, **Catalysis Today**, 2014, 237, 1-2.
176. S.Wan and Y.Wang, "A review on *ex situ* catalytic fast pyrolysis of biomass", **Frontiers of Chemical Science and Engineering**, 2014, 8 (3): 280-294. DOI: 10.1007/s11705-014-1436-8 (invited review).
175. Y.Yang, J.S.Dennis, M.Saeyns, Y.Wang, Preface, **Catalysis Today**, 2014, 233, 1.
174. Y.Li, Z.Weil, Y.Wang, "Ni/MgO Catalyst Prepared via Dielectric-Barrier Discharge Plasma with Improved Catalytic Performance for Carbon Dioxide Reforming of Methane", **Frontiers of Chemical Sciences and Engineering**, 2014, doi: 10.1007/s11705-014-1422-1.
173. O.G.Marin-Flores, A.Karim, Y.Wang, "Role of tungsten in the aqueous phase hydrodeoxygenation of ethylene glycol on tungstated zirconia supported palladium", **Catalysis Today**, 2014, 237, 118-124, doi: 10.1016/j.cattod.2014.03.068.
172. C.Liu, H.Wang, A.Karim, J.Sun, Y.Wang, "Advances in catalytic pyrolysis of lignocellulosic biomass", **Chem.Soc.Rev.** 2014, 43(22), 7594-7623 (inside cover of the Nov. issue).
171. K.Ramasamy, Y.Wang, "Ethanol conversion on HZSM-5: effect of reaction conditions and Si/Al ratio on the product distributions", **Catalysis Today**, 2014, 237, 89-99, doi:10.1016/j.cattod.2014.02.044.
170. Y.Li, Z.Weil, F.Gao, L.Kovarik, C.H.F.Peden, Y.Wang, "Effects of CeO<sub>2</sub> Support Facets on VO<sub>x</sub>/CeO<sub>2</sub> Catalysts in Oxidative Dehydrogenation of Methanol", **J.Catal.**, 2014, doi:10.1016/j.jcat.2014.04.013.
169. S.Davison, J.Sun, H.Zhang, Y.Wang, "Supported metal catalysts for alcohol/sugar alcohol steam reforming", **Dalton Transactions**, 2014, DOI:10.1039/c4dt00521j (invited perspective, cover of the issue 31 of 2014).
168. K.Ramasamy, H.Zhang, J.Sun, Y.Wang, "Performance of hierarchical HZSM-5 for the conversion of ethanol to hydrocarbon", **Catalysis Today**, 2014, DOI:10.1016/j.cattod.2014.1001.1037.
167. J.Sun, Y.Wang, "Review of ethanol conversion to chemicals and fuels", **ACS Catalysis**, 2014, dx.doi.org/10.1021/cs4011343. (featured on cover of the 2014 April issue).

166. J.Kwak, R.Dagel, G.Tustin, J.Zoeller, L.Allard, Y.Wang, "Molecular active sites in heterogeneous Ir-La/C catalyzed carbonylation of methanol to acetates", *J.Phys.Chem.Lett.* 2014, dx.doi.org/10.1021/jz402728e.
165. S.Davidson, J.Sun, Y.Wang, "The effect of ZnO addition on Co/C catalyst for vapor and aqueous phase reforming of ethanol", *Catal.Today*, 2014, dx.doi.org/10.1016/j.cattod.2013.12.044.
164. A.J.Hensley, R.Zhang, Y.Wang, J.S.McEwen, "Energetic and electronic interactions between benzene and PdFe surfaces: a density functional theory study", *J.Phys.Chem.C* 2013, 117, 24317-24328.
163. W.Li, L.Kovarick, D.Mei, J.Liu, Y.Wang, C.H. F.Peden, "Anti-sintering Pt nanoparticles stabilized by MgAl<sub>2</sub>O<sub>4</sub> spinel {111} facets", *Nature Comm.*, 2013, DOI: 10.1038/ncomms3481.
162. Z.Chase, J.Fulton, D.Camaioni, D.Mei, M.Balasubramanian, V.Pharm, C.Zhao, R.Weber, Y.Wang, J.Lercher, "State of Supported Pd during Catalysis in Water", *J.Phys.Chem.C*, 2013, DOI: 10.1021/jp404772p.
161. K.K.Ramasamy, M.A.Gerber, M.Flake, H.Zhang, Y.Wang, "Conversion of biomass-derived small oxygenates over HZSM-5 and its deactivation mechanism", *Green Chemistry*, 2013, DOI: 10.1039/c3gc41369a.
160. C.J.Liu, J.Sun, C.Smith, Y.Wang, "A study of Zn<sub>x</sub>Zr<sub>y</sub>O<sub>z</sub> mixed oxides for direct conversion of ethanol to isobutene", *Appl.Catal.A: General*, 2013, doi:10.1016/j.apcata.2013.07.011.
159. V.M.Lebarbier, R.A.Dagle, L.Kovarick, K.O.Albrecht, C.E.Taylor, X.Bao, Y.Wang, "Sorption-enhanced synthetic natural gas from syngas: a novel process combining CO methanation, water-gas-shift, and CO<sub>2</sub> capture", *Appl.Catal.B: Environmental*, 2013, DOI: 10.1016/j.apcatb.2013.06.034.
158. J.Sun, A.M.Karim, H.Zhang, L.Kovarick, X.Li, J.S.McEwen, A.J.Hensley, Y.Wang, "Vapor phase hydrodeoxygenation of guaiacol on carbon supported metal catalysts", *J.Catal.*, 2013, doi:10.1016/j.jcat.2013.05.020.
157. B.Halevi, S.Lin, A.Roy, H.Zhang, E.Jeroro, J.Vohs, Y.Wang, H.Guo, A.Datye, "High CO<sub>2</sub> selectivity of ZnO powder catalysts for methanol steam reforming", *J.Phys.Chem.C*, 2013, 117(13): 6493-6503.
156. X.Yan, Y.Liu, B.Zhao, Y.Wang, and C.J. Liu, "Enhanced sulfur resistance of Ni/SiO<sub>2</sub> catalyst for methanation via the plasma decomposition of nickel precursor", *Phys.Chem.Chem.Phys.*, 2013, DOI: 10.1039/C3CP50694K.
155. R.A.Dagle, J.Hu, S.B.Jones, W.Wilcox, J.G.Frye, J.F.White, Y.Wang, "Carbon dioxide conversion into valuable chemical products over composite catalytic systems", *Journal of Energy Chemistry*, 2013, 22(3): 368-374.
154. C.Liu, J.Sun, V.Lebarbier, A.Karim, Y.Wang, "Vapor phase ketonization of acetic acid on ceria based metal oxides", *Topics in Catalysis*, 2013, doi:10.1007/s11244-013-0114-2.
153. H.Wang and Y.Wang, "Biomass to bio-oil by liquefaction", Chapter 8 in *Biomass Processing, Conversion and Biorefinery*, B.Zhang and Y.Wang, eds., ISBN: 978-1-62618-346-9, 2013 (Nova Science Publishers).
152. C.Liu and Y.Wang, "Biofuel and bio-oil upgrading", Chapter 13 in *Biomass Processing, Conversion and Biorefinery*, B.Zhang and Y.Wang, eds., ISBN: 978-1-62618-346-9, 2013 (Nova Science Publishers).
151. O.Marin-Flores, A.L.Tonkovich, Y.Wang, "Biodiesel Production", Chapter 14 in *Biomass Processing, Conversion and Biorefinery*, B.Zhang and Y.Wang, eds., ISBN: 978-1-62618-346-9, 2013 (Nova Science Publishers).

150. K.K.Ramasamy and Y.Wang, "Thermochemical conversion of fermentation-derived oxygenates to fuels", Chapter 17 in *Biomass Processing, Conversion and Biorefinery*, B.Zhang and Y.Wang, eds., ISBN: 978-1-62618-346-9, 2013 (Nova Science Publishers).
149. S.Davidson, J.Sun, Y.Wang, "Ethanol steam reforming on Co/CeO<sub>2</sub>: the effect of ZnO promoter", *Topics in Catalysis*, 2013, doi: 10.1007/s11244-013-0103-5.
148. H.Wang, J.Male, Y.Wang, "Recent advances in hydrotreating of pyrolysis bio-oil and its oxygen-containing model compounds", *ACS Catalysis*, 2013, 3, 1047-1070, dx.doi.org/10.1021/cs400069z (invited review).
147. Y.Li, Z.Weiz, J.Sun, F.Gao, C.H.F.Peden, Y.Wang, "The effect of sodium on the catalytic properties of VOx/CeO<sub>2</sub> catalysts for oxidative dehydrogenation of methanol", *J.Phys.Chem.C* 2013, 117(11):5722-5729. doi:10.1021/jp310512m.
146. X.Yan, Y.Liu, B.Zhao, Y.Wang, C.J.Liu, "Methanation over Ni/SiO<sub>2</sub>: Effect of the Catalyst Preparation Methodologies", *International Journal of Hydrogen Energy*, Volume 38, Issue 5, 2013 2283-2291.
145. K.K.Ramasamy, Y.Wang, "Catalyst activity comparison of alcohols over zeolites", *Journal of Energy Chemistry*, 2013, 22(1)65-71, dx.doi.org/10.1016/s2095-4956(13)600008-X.
144. H.Zhao, B.Zhao, X.Yan, Y.Liu, Y.Wang, C.J.Liu, "Ni/SiO<sub>2</sub> catalyst for CO methanation with support treated by dielectric barrier discharge plasma", *CIESC Journal*, DOI:10.3969/j.issn.0438-1157.2013.01.004, 2013, 64(1): 283-288.
143. J.Sun, D.Mei, A.Karim, A.Datye, Y.Wang, "Minimizing the formation of coke and methane on Co nanoparticles in steam reforming of biomass-derived oxygenates", *ChemCatChem*. 2013, 5(6), 1299-1303 DOI:10.1002/cctc.201300041.(cover page featured in the June issue).
142. Y.Shao, F.Ding, J.Xiao, J.Zhang, W.Xu, S.Park, J.Zhang, Y.Wang, J.Liu, "Making li-air batteries rechargeable: material challenge", *Advanced Functional Materials*, 2013, 23(8):987-1004. doi:10.1002/adfm.201200688.
141. A.Karim, C.Howard, B.Roberts, L.Kovarik, L.Zhang, D.L.King, Y.Wang, "in situ EXAFS studies on the effect of pH on Pt electronic density during aqueous phase reforming of glycerol", *ACS Catalysis*, DOI:10.1021/cs3005049, 2012, 2, 2387-2394.
140. Z.Weiz, J.Sun, H.Zhang, Y.Li, Y.Wang, "Bimetallic nanocatalysts hydrogen generation", *Chem.Soc.Review* 2012, DOI:10.1039/C2CS35201J (invited review).
139. S.Park, Y.Shao, J.Liu, Y.Wang, "Oxygen electrocatalysts for water electrolyzers and reversible fuel cells: status and perspective", *Energy & Environmental Science* DOI:10.1039/c2ee22554a (invited review).
138. K.Zhu, J.Sun, H.Zhang, J.Liu, Y.Wang, "Carbon as a hard template for nano material catalysts", *J.Natural Gas Chemistry*, 2012, 21(3): 215-232 (invited review).
137. X.She, J.H.Kwak, J.Sun, J.Hu, M.Y.Hu, C.Wang, C.H.F.Peden, Y.Wang, "A comparative study of SBA-15 mesoporous silica supported tungsten oxide and rhenium oxide catalysts for 2-butanol dehydration", *ACS Catalysis*, 2012, 2(6), 1020-1026, DOI:10.1021/cs2006444.
136. B.Halevi, E.J.Peterson, A.Roy, A.DeLariva, E.Jeroro, F.Gao, Y.Wang, J.M.Vohts, B.Kiefer, E.Kunkes, M.Havecker, MBehrens, R.Schlogl, A.Datye, "Catalytic reactivity of face centered cubic PdZn for the steam reforming of methanol", *J.Catal.*, 2012, 291, 44-54, doi:10.1016/j.jcat.2012.04.002.
135. Y.Shao, S.Park, J.Xiao, J.Zhang, Y.Wang, J.Liu, "Electrocatalysts for nonaqueous lithium-air batteries: status, challenges, and perspective", *ACS Catalysis*, 2012, 2, 844-857, dx.doi.org/10.1021/cs300036v (invited review).

134. D.Me, A.Karim, Y.Wang, "On the reaction mechanism of acetaldehyde decomposition on Mo(110)", *ACS Catalysis*, 2012, DOI:10.1021/cs3000039.
133. S.Park, Y.Shao, V.V.Viswanathan, S.Towne, P.C.Rieke, J.Liu, Y.Wang, "Non-kinetic losses caused by electrochemical carbon corrosion in PEM fuel cells", *J.Hydrogen Energy*, 2012, dx.doi.org/10.1016/j.ijhydene.2012.02.097.
132. S.L.Candelaria, Y.Shao, Y.Zhou, X.Li, J.Xiao, J.Zhang, Y.Wang, J.Liu, J.Li, G.Cao, "Nanostructured carbon for energy storage and conversion", *Nano Energy*, 2012, 1, 195-220.
131. S.Park, Y.Shao, H.Wan, V.V.Viswanathan, S.A.Towne, P.C.Rieke, J.Liu, Y.Wang, "Degradation of ionic pathway in PEM fuel cell cathode", *J.Phys.Chem.C*, 2011, 115(45), pp22633-22639, doi: 10.1021/jp2068599.
130. J.Hu, J.H.Kwak, Y.Wang, M.Y.Hu, R.V.Turcu, C.H.F.Peden, "Characterizing surface acidic sites in mesoporous silica supported tungsten oxide catalysts using solid state NMR and quantum chemistry calculations", *J.Phys.Chem.C*, 2011, doi:10.1021/jp203813f.
129. VMC Lebarbier, D Mei, DH Kim, A Andersen, JL Male, JE Holladay, RJ Rousseau, and Y Wang. 2011. "Effects of La2O3 on the mixed higher alcohols synthesis from syngas over Co catalysts: A combined theoretical and experimental study." *J.Phys.Chem.C* 115(35):17440-17451. doi:10.1021/jp204003q.
128. J.Hu, J.A.Sears, H.S.Mehta, J.J.Ford, J.H.Kwak, K.Zhu, Y.Wang, J.Liu, C.H.F.Peden, D.W.Hoyt, "A large sample volume magic angle spinning nuclear magnetic resonance probe for in situ investigations with constant flow of reactants", *Phys.Chem.Chem.Phys.* 2011, DOI: 10.1039/C1CP22692D.
127. L.Zhang, A.M.Karim, Z.Wei., D.L.King, Y.Wang, "Correlation of Pt-Re surface property with reaction pathways in aqueous phase reforming of glycerol", *J.Catal.* (2012), doi:10.1016/j.jact.2011.11.015.
126. V.M.Lebarbier, A.M.Karim, M.H.Engelhard, Y.Wu, B-Q Xu, E.Petersen, A.K.Datye, Y.Wang, "The effect of Zn addition on oxidation state of cobalt for Co/ZrO2 catalysts", *ChemSusChem*, 2011, 4(11) pp1679-1684. Doi:10.1002/cssc.201100240.
125. W.Liu, Y.Wang, W.Wilcox, S.Li, "Multi-scale structured Fixed Bed Catalytic Reactor for Gas to Liquid Conversion", *AIChE J.*, 2011, DOI:10.1002/aic.12797.
124. J.Sun, K.Zhu, F.Gao, C.Wang, J.Liu, C.H.F.Peden, Y.Wang, "Direct conversion of bio-ethanol to isobutene on nanosized Zn<sub>x</sub>Zr<sub>x</sub>O<sub>z</sub> mixed oxides with balanced acid-base sites", *J.Am.Chem.Soc.*, 2011, 133(29) pp11096-11099, DOI: 10.102/ja204235v.
123. D.Me, A.M.Karim, Y.Wang, "Density functional theory study of acetaldehyde hydrodeoxygenation on MoO<sub>3</sub>", *J.Phys.Chem.C*, 2011, 115 (16), pp8155-8164, DOI: 10.1021/jp200011j.
122. K.Zhu, J.Sun, J. Liu, Q.Wang, H.Wan, J.Hu, Y.Wang, C.H.F.Peden, Z.Nie, "Solvent evaporation assisted preparation of oriented nanocrystalline mesoporous MFI zeolites", *ACS Catalysis*, 2011, 1(7) 682-690, DOI: 10.1021/cs200085e.
121. X.She, H.M.Brown, X.Zhang, B.K.Ahring, and Y.Wang, "Selective hydrogenation of trans, trans-muconic acid to adipic acid over supported rhenium catalysts", *ChemSusChem*, 2011, doi:10.1002/cssc.201100020.
120. R.Kou, Y.Shao, D.Me, Z.Mie, D.Wang, C.Wang, V.V.Viswanathan, S.Park, I.A.Aksay, Y.Lin, Y.Wang, J.Liu, "Stabilization of electrocatalysts at metal-metal oxide-graphene triple junction points: an experimental and theoretical study", *J.Am.Chem.Soc.*, 2011, dx.doi.org/10.1021/ja107719u.

119. A.M.Karim, Y.Su, M.H.Engelhard, D.L.King, Y.Wang, "Catalytic roles of Co<sup>0</sup> and Co<sup>2+</sup> during steam reforming of ethanol on Co/MgO catalysts", *ACS Catalysis*, 2011, dx.doi.org/10.1021/cs200014j.
118. S.Park, Y.Shao, V.V.Viswanathan, S.Towne, P.C.Rieke, J.Liu, Y.Wang, "Polarization losses under accelerated stress test using multiwalled-carbon-nanotube supported Pt catalyst in PEM fuel cells", *J.Electrochemical Society* 158 (3) (2011) B297-302.
117. S.Park, Y.Shao, H.Wan, P.C.Rieke, V.V.Viswanathan, S.Towne, L.V.Sarf, J.Liu, Y.Lin, Y.Wang, "Design of grapheme sheets-supported Pt catalyst layer in PEM fuel cells", *Electrochemistry Communications*, 13 (2011) 258-261.
116. L.Zhang, G.Xia, Y.Yang, D.Heldebrant, D.L.King, Y.Wang, L.Allard, "Morphological and Electronic Structure of Pt-Re Nanoparticles Supported on Carbon under Activation and Reaction Conditions for Aqueous-Phase Reforming of Bioliquid", *Microscopy and Microanalysis*, 16 (2010) 1454-1455.
115. B.Halevi., E.J. Peterson, A. Delariva, E. Jeroro, V.M. Lebarbier, Y. Wang, J.M. Vohs, B. Kiefer, E. Kunkes, M. Havecker, M. Behrens, R. Sehlogl, and A.K. Datye, "Aerosol-Derived Bimetallic Alloy Powders: Bridging the Gap", *Journal of Physical Chemistry C*, 114(40) (2010) 17181-17190.
114. D.L.King, L.Zhang, G.Xia, A.M.Karim, D.J.Heldebrant, X.Wang, T.Peterson, and Y.Wang, "Aqueous phase reforming of glycerol for hydrogen production over Pt-Re supported on carbon", *Appl.Catal B: Environmental*, 99 (2010) 206-213.
113. X.Wang, J.S. Lee, Q. Zhu, J. Liu, Y. Wang, S. Dai, "Ammonia-treated Ordered Mesoporous Carbons as Ultrastable Catalytic Materials for Oxygen Reduction Reaction), *Chem.Mater* 22(7) (2010) 2178-2180.
112. V.Lebarbier, R.A.Dagle, A.Datye, Y.Wang, "The effect of PdZn particle size on reverse-water-gas-shift reaction", *Appl.Catal. A: General*. 379 (2010) 3-6.
111. Y.Wang and A.Gaffney, Preface, *Catalysis Today*, 156(1-2) (2010) 1.
110. A.M.Karim, Y.Su, J.Sun, C.Yang, J.J.Strohm, D.L.King, and Y.Wang, "A comparative study between Co and Rh for steam reforming of ethanol", *Appl. Catal.B: Environmental* 96 (2010) 441-448.
109. S.Zhang, Y.Shao, X.Li, Z.Nie, Y.Wang, J.Liu, G.Yin, Y.Lin, "Low-cost and durable catalyst support for fuel cells: graphite submicronparticles", *J.Power.Sources*, 195 (2) (2010) 457-460.
108. Y.Shao, S.Zhang, M.H.Engelhard, G.Li,G.Shao, Y.Wang, J.Liu, I.A.Aksay, Y.Lin, "Nitrogen-doped grapheme and its electrochemical applications", *J.Mater.Chem.*, 20 (2010) 7491-7496.
107. Y.Shao, S.Zhang, R.Kou, X.Wang, C.Wang, S.Dai, V.Viswanathan, J.Liu, Y.Wang, Y.Lin, "Noncovalently functionalized graphitic mesoporous carbon as a stable support of Pt nanoparticles for oxygen reduction", *J.Power Sources*, 195 (7) (2010) 1805-1811.
106. Y.Shao, S.Zhang, C.Wang, Z.Nie, J.Liu, Y.Wang, Y.Lin, "Highly durable graphene nanoplatelets supported Pt nanocatalysts for oxygen reduction", *J.Power.Sources* 195 (2010) 4600-4605.
105. L.Li, d.L.King, J.Liu.Q.Hou, K.Zhu, C.Wang, M.Gerber, D.Stevens, Y.Wang, "Stabilization of Metal Nanoparticles in Cubic Mesostructure Silica and Its Application in Regenerable Deep Desulfurization of Warm Syngas", *Chem.Mater.*, 21 (22) (2009)5358-5364.
104. J.Lee, D.Lee, K.Y.Lee, and Y.Wang, "Cr-free Fe-based metal oxide catalysts for high temperature water gas shift reaction of fuel processor using LPG", *Catal.Today* 146 (1-2) (2009) 260-264.



103. M.P.Hyman, V.Lebardier, Y.Wang, A.Datye, J.M.Vohts, "A Comparison of the Reactivity of Pd Supported on ZnO (1010) and ZnO(0001)", **J.Phys.Chem.:C** 131 (2009) 7251-7259.
102. Y.Shao, J.Wang, R.Kou, J.Liu, Y.Wang, Y.Lin. "The durability dependence of Pt/CNT electrocatalysts on the nanostructures of carbon nanotubes: hollow- and bamboo-CNTs", **J. Nanoscience and Nanotechnology** 9 (10) (2009) 5811-5815.
101. R.Kou, Y.Shao, D.Wang, M.H. Engelhard, J.Kwak, J.Wang, V.V. Viswanathan, Y.Lin, Y.Wang, I.A. Aksay, J.Liu, "Functionalized Graphene Sheets Supported Pt Nanoparticles as Novel Cathode Electrocatalysts for Proton-Exchange Membrane Fuel Cells", **Electrochemistry Communications**, 11(5) (2009) 954-957.
100. K.Zhu, X.She, J.Hu, Z.Nie, J.Liu, Y.Wang, C. H. F. Peden, J. Kwak, "Dispersing and Characterization of Polyoxometalates on Mesoporous Zeolite", **J.Am.Chem.Soc.** 131(28) (2009) 9715-9721.
99. X.She, M.Flytzani-Stephanopoulos, C.Wang, Y.Wang, C.H.F.Peden, "SO<sub>2</sub>-induced stability of Ag-alumina catalysts in the SCR of NO with methane", **Appl.Catal.B: Environmental** 88 (2009) 98-105.
98. W.Liu, D.L.King, J.Liu, B.Johnson, G.Yang, Y.Wang, "Critical Material and Process Issues for CO<sub>2</sub> Separation from Coal-Powered Plants", **JOM. The Journal of the Minerals, Metals, and Materials Society**, 61(4) (2009) 36-44.
97. Y.Shao, J.Wang, R.Kou, M.Engelhard, J.Liu, Y.Wang, Y.Lin. "The corrosion of PEM fuel cell catalyst supports and its implications for developing durable catalysts", **Electrochimica Acta** 54 (11) (2009) 3109-3114.
96. J.Hu, J.A. Sears, J.Kwak, D.W. Hoyt, Y.Wang and C.H. F. Peden, "An Isotropic Chemical Shift-Chemical Shift Anisotropic Correlation Experiment Using Discrete Magic Angle Turning", **J.Magn.Reson.** doi: 10.1016/j.jmr.2009.01.027.
95. J. Hu, J.Kwak, Y.Wang, C.H.F.Peden, H.Zheng, D.Ma, and X.Bao, "Studies of the Active Sites for Methane Dehydroaromatization Using Ultra-High Field Solid State <sup>95</sup>Mo NMR Spectroscopy", **J.Phys.Chem: C** 113 (2009) 2936-2942.
94. Y.Wang and A.Gaffney, preface, **Catalysis Today**, 140 (2009) 117.
93. W.Liu, J.Hu, and Y.Wang "Tailoring of Fischer-Tropsch Product Distributions Using a Monolithic Reactor", **Catalysis Today**. 140 (2009) 142-148.
92. A.Platon and Y.Wang "Chapter 6. Water-gas shift technologies" in "Hydrogen and syngas production and purification technologies" ed. K.Liu, C.Song, V.Subramani, published online: Nov 30, 2009, DOI:10.1002/9780470561256.ch6.
91. J.Cao, J.Hu, S.Li, C.Chin, W.Wilcox, and Y.Wang "Intensified Fischer-Tropsch Synthesis Process Using Microchannel Catalytic Reactors," **Catal.Today** 140 (2009) 149-156.
90. Y.Shao, J.Liu, Y.Wang, Y.Lin, "Novel Catalyst Support Materials for PEM Fuel Cells: Current Status and Future Prospects", **J.Mater.Chem.** 19 (1) (2009) 46-59.
89. J.D.Holladay, J.Hu, D.L.King, Y.Wang, "An overview of hydrogen production technologies", **Catal.Today** 139 (2009) 244-260.
88. Y.Shao, R.Kou, J.Wang, J. Kwak, V.Viswanathan, Y.Wang, J.Liu, Y.Lin. "Fast test for the durability of PEM fuel cell catalyst". **ECS Transactions**, 16(2) (2008) 361-366.
87. J.E. Herrera, J.H.Kwak, J.Z.Hu, Y.Wang, C.H.F. Peden, "Effects of novel supports on the physical and catalytic properties of tungstophosphoric acid for alcohol dehydration reactions" **Topics in Catalysis**, 49 (2008) 259-267.

86. V. Lebarbier, R. Dagle, T. Conant, J.M. Vohs, A. Datye, Y. Wang, "CO/FTIR Spectroscopic Characterization of Pd/ZnO/Al<sub>2</sub>O<sub>3</sub> catalysts and Its Correlation with Methanol Steam Reforming", **Catal.Letts.** 122(3&4) (2008) 223-227.
85. D.L.King, J.J.Strohm, X.Q.Wang, H.S.Roh, C.M.Wang, Y.H.Chin, Y.Wang, Y.B.Lin, R.Rozmiarek, P.Singh, "Effect of nickel microstructure on methane steam-reforming activity of Ni-YSZ cermet anode catalysts", **J.Catal.** 258 (2) (2008) 356-365.
84. Y. Shao, R. Kou, J. Wang, V.V. Viswanathan, J.H. Kwak, J.Liu, Y.Wang, Y. Lin, "The influence of the electrochemical stressing (potential step and potential-static holding) on the degradation of PEM fuel cell electrocatalysts", **J.Power Sources** 185 (2008) 280-286.
83. T.Conant, A.M. Karim, V.Lebarbier, Y.Wang, F.Girgsdies, R.Schlögl, and A. Datye, "Highly stable bimetallic PdZn catalysts for the steam reforming of methanol", **J.Catal.** 257(1) (2008) 64.
82. R.A. Dagle, A.Platon, D.R. Palo, A.K.Datye, J.M.Vohs, Y.Wang, "PdZnAl Catalysts for the Reactions of Water-Gas-Shift, Methanol Steam Reforming, and Reverse-Water-Gas-Shift", **Appl.Catal. A: General.** 342 (2008) 63-68.
81. H.Zheng, M.Ding, X.Bo, J.Hu, J.Kwak, C.H.F.Peden, Y.Wang, "Direct observation of active center for methane aromatization reaction using an ultra-high field <sup>95</sup>MoNMR", **J.Am.Chem.Soc.** 130 (2008) 3722-3723.
80. B.C. Gates, G.W.Huber, C.L. Marshall, P.N. Ross, J.Sirola, Y.Wang, "Catalysts for Emerging Energy Applications", **MRS Bull.**, Vol. 33, No. 4 (April 2008) pp. 249-488.
79. H.Roh, Y.Wang, D.L.King, "Selective production of hydrogen from bio-ethanol at low temperatures over Rh/CeO<sub>2</sub>-ZrO<sub>2</sub> catalysts", **Topics in Catalysis**, 49(1&2) (2008) 32-37.
78. R.A.Dagle, C.Chin, Y.Wang, "The effects of PdZn crystallite size on methanol steam reforming", **Topics in Catalysis**, 46 (2007) 358-362.
77. A.Platon, H.Roh, D.L.King, Y.Wang, "Deactivation studies of ethanol steam reforming catalysts", **Topics in Catalysis** 46 (2007) 374-379.
76. E. Jeroro, V. Lebarbier, A. Datye, Y. Wang and J. M. Vohs, "Interaction of CO with Surface PdZn Alloys" **Surf.Sci.** 601 (2007) 5546-5554.
75. R.J.Chmentao, J.E.Herrera, J.H.Kwak, F.Medina, Y.Wang, C.H.F.Peden, "Oxidation of Ethanol to Acetaldehyde over Na-promoted vanadium oxide catalysts", **Appl.Catal.A:General** 332(2) (2007) 263-272.
74. C.Cao, D.P.Palo, A.L.Y.Tonkovich, Y.Wang, "Catalyst screening and kinetic studies using microchannel reactors", **Catalysis Today** 125 (2007) 29-33.
73. R.A.Dagle, D.Palo, G.Xia, J.Holladay, Y.Wang, "Selective CO methanation catalysts for microscale fuel processing applications", **Appl.Catal. A: General:** 326 (2007) 213-218.
72. H.Zao, J.H.Kwak, Y.Wang, J.A.Franz, J.M.White, J.E.Holladay, "Interactions between cellulose and n-methylmorpholine-N-oxide", **Carbohydrate Polymers** 67(1) (2007) 97-103.
71. Y.Wang, K.Y.Lee, S.Choi, J.Liu, L.Q.Wang, C.H.F.Peden, "Grafting sulfated zirconia on mesoporous silica", **Green Chemistry**, 9 (2007) 540-544.
70. Y.Wang, D.L.King, preface of **Catal. Today** 120(1) (2007) 1.
69. Cao C, JF White, Y Wang, and JG Frye. 2007. "Selective Hydrogenolysis of Sugar Alcohols Over Structured Catalysts." In *Catalysis of Organic Reactions*, vol. 115, pp. 289-291. CRC Press-Taylor & Francis Group, Boca Raton, FL.

68. B.R.Johnson, N.L.Canfield, D.N.Tran, R.A.Dagle, Y.Wang, "Hydrothermally Stable and Active Engineered Porous Ceramic Catalysts for Steam Methane Reformation", **Catal.Today** 120(1) (2007) 54-62.
67. J.Hu, Y.Wang, C.Cao, D.C.Elliott, D.J.Stevens, J.F.White, "Conversion of biomass-derived syngas to alcohols and C2 oxygenates using supported Rh catalysts in a microchannel reactor", **Catal.Today** 120 (2007) 90-95.
66. A.L.Y.Tonkovich, B.Yang, S.T.Perry, S.P.Fitzgerald, Y.Wang, "From milliseconds to microseconds: changing the microchannel reaction paradigm", **Catal.Today**.120(1) (2007) 21-29.
65. J.Hu, G.Xia, J.F.White, T.H.Peterson, Y.Wang, "Biphasic catalytic oxidation of hydrocarbons using immobilized homogeneous catalyst in a microchannel reactor," In **Catalysis of Organic Reactions**, chemical Industry Series, vol. 115, ed. SR Schmidt. CRC Press, Boca Raton, FL. (2006).
64. Y.H.Chin, D.L.King, H.S.Roh, Y.Wang, S.M.Heald, "Structure and reactivity investigations on supported bimetallic Au-Ni catalysts used for hydrocarbon steam reforming", **J.Catal.** 244(2) (2006) 153-162.
63. J.E.Herrera, J.Kwak, J.Hu, Y.Wang, C.H.F.Peden, "Synthesis of monodispersed oxides of vanadium, titanium, molybdenum, tungsten on mesoporous silica using atomic layer deposition", **Topics in Catalysis** 39 (3&4) (2006) 245-255.
62. H.Roh, Y.Wang, D.L.King, A.Platon, C.Chin "Low temperature and H2 selective catalysts for ethanol steam reforming", **Catal.Letts.** 108 (1&2): 15-19 (2006).
61. H.Zhao, J. Kwak, Y.Wang, J.A. Franz, J.M.White, J.E. Holladay, "Effects of crystallinity on dilute hydrolysis of cellulose", **Energy & Fuels** 20: 807-811 (2006).
60. J.E.Herrera, J.Kwak, J.Hu, Y.Wang, C.H.F.Peden, J.Macht, E.Iglesia, "Preparation and characterization of novel highly dispersed tungsten oxide catalysts on mesoporous silica", **J.Catal.** 239: 200-211 (2006).
58. J.E.Herrera, J.Kwak, J.Hu, Y.Wang, C.H.F.Peden, "A new class of highly dispersed V2O5 catalysts on mesoporous silica: synthesis, characterization, and catalytic activity in the partial oxidation of ethanol", **Appl.Catal. A: General.** 300 (2006) 109-119.
59. H.Roh, A.Platon, Y.Wang, D.L.King, "Catalyst Deactivation and Regeneration in Low Temperature Ethanol Steam Reforming with Rh/CeO<sub>2</sub>-ZrO<sub>2</sub> Catalysts", **Catal.Lett.** 110 (1&2) (2006) 1-6.
57. Y.Shin, X.S.Li, W.D.Samuels, Y.Wang, L.R.Pederson, G.J.Exarhos, "Synthesis of metal carbides using biological templates", **Materials Research Soc.Sym.Proc.**, 879 (2005) 227-232.
56. V.R. Sarsani, Y. Wang, and B.Subramaniam, "Toward stable solid acid catalysts for 1-butene + isobutane alkylation: investigations of heteropolyacids in dense CO<sub>2</sub> media", **Ind.Eng.Chem.Res.** 44 (2005) 6491-6495.
55. C.Chin, J.Cao, J.Hu, Y.Wang, "Carbon nano-tube supported Co catalysts for Fischer-Tropsch synthesis", **Catal.Today**, 110 (2005) 42-47.

54. Wang, Yong; Holladay, Jamelyn D. Preface. ACS Symposium Series (2005), 914(Microreactor Technology and Process Intensification), xi-xii. CODEN: ACSMC8 ISSN:0097-6156. AN 2006:276832.
53. J.Cao, Y.Wang, R.T.Rozmiarek, "Heterogeneous reactor model of methane steam reforming in a microchannel reactor with microstructured catalysts", *Catal.Today*, 110 (2005) 92-95.
52. Y.Wang, B.R.Johnson, C.Cao, Y-H.Chin, R.T.Rozmiarek, Y.Gao, A.L.Y.Tonkovich, "Engineered Catalysts for Microchannel Reactor Applications", in *Microreactor Technology and Process Intensification*, Y.Wang, J.D.Holladay, eds; American Chemical Society, Washington, DC, vol 914, 2005, pp.102-118.
51. A.L.Y.Tonkovich and Y.Wang "Overview of Early-Stage Microchannel Reactor Development at Pacific Northwest National Laboratory", in *Microreactor Technology and Process Intensification*, Y.Wang, J.D.Holladay, eds; American Chemical Society, Washington, DC, vol 914, 2005, pp.47-65.
50. K.Jarosch, A.L.Y.Tonkovich, S.Perry, D.Kuhlmann, and Y.Wang "Microchannel reactors for intensifying gas-to-liquid technology", in *Microreactor Technology and Process Intensification*, Y.Wang, J.D.Holladay, eds; American Chemical Society, Washington, DC, vol 914, 2005, pp.258-272.
49. C.Cao, Y.Wang, J.Hu, S.B.Jones, X.S.Li, D.C.Elliott, D.J.Stevens, "Microchannel catalytic processes for converting biomass derived syngas to transportation fuels", in *Microreactor Technology and Process Intensification*, Y.Wang, J.D.Holladay, eds; American Chemical Society, Washington, DC, vol 914, 2005, pp.273-284.
48. J.D.Holladay, E.O.Jones, R.A.Dagle, G.Xia, C.Cao, Y.Wang, "Miniaturization of a hydrogen plant", in *Microreactor Technology and Process Intensification*, Y.Wang, J.D.Holladay, eds; American Chemical Society, Washington, DC, vol 914, 2005, pp.162-178.
47. G. Xia, J.Holladay, R.A. Dagle, E.Jones, and Y.Wang, "Development of highly active Pd-ZnO/Al<sub>2</sub>O<sub>3</sub> catalysts for micro-scale fuel processor applications", *Chem.Eng.Tech.* 28(4) 515-519 (2005).
46. J.Cao and Y.Wang, "Kinetic Analysis of Complex Reactions Using FEMLAB", *Chem.Eng.Tech* 28(6) 649-654 (2005).
45. J.Hu, Y.Wang, C.Cao, D.C.Elliott, D.Stevens, and J.White "Conversion of Biomass Syngas to DME using a Microchannel Reactor", *Ind.Eng.Chem.Res.* 44 1722-1727 (2005).
44. C. Cao, J. Holladay, E. Jones, D. Palo and Y.Wang, "Modeling a Mili-Watt Fuel Processor", *AIChE J.* 51(3) (2005) 982-988.
43. J.Hu,J.Kwak, J.E.Herrera,Y.Wang, C.H.F.Peden, "Resolution Enhancement in <sup>1</sup>H MAS Spectrum of Mesoporous Silica By Removing Absorbed H<sub>2</sub>O Using N<sub>2</sub>", *J.Magn.Reson.* 27 (2005) 200-205.
42. Y.Wang, C.Chin, R.T.Rozmiarek, and J.Watson,"Highly Active and Robust Methane Steam Reforming Catalysts", *Catal.Today.* 98 575-581 (2004).

41. J.G.Frye, A.H.Zacher, T.A.Werpy, and Y.Wang, "Catalytic Preparation of Pyrrolidones from Renewable Resources." pp.145-154 in *Organic Reactions Catalysis* - vol. 104, Press-Taylor & Francis Group, Warrendale, PA, 2004.
40. X.Ye, Y.Lin, C.Wang, M. H. Engelhard, Y.Wang, C.M. Wai, "Supercritical Fluid Synthesis and Characterization of Catalytic Metal Nanoparticles on Carbon Nanotubes", *J.Mater.Chem.* 14 908-913 (2004).
39. J.Holladay, Y.Wang, and E.Jones, "Review of developments of portable hydrogen production using microreactor technology", *Chem.Rev.* 104 (10) 4767-4790 (2004).
38. T.Mazanec, S.Perry, A.L.Y.Tonkovich, and Y.Wang, "Microchannel gas to liquid conversion – thinking big by thinking small" *Stud.Surf.Sci.Catal.* 147 (2004) 169-174.
37. A.Y.Tonkovich, S.Perry, Y.Wang, W.A. Rogers, D.Qiu, and Y.Peng, "Microchannel Process Technology for Compact Methane Steam Reforming", *Chem.Eng.Sci.* 59 (22&23) (2004) 4819-4824.
36. C.Cao, G.Xia, J.Holladay, E.Jones, and Y.Wang, "Kinetic Studies of Methanol-Steam Reforming Over Pd/ZnO Catalyst Using a Microchannel Reactor", *Appl.Catal.: General.* 262 19-29 (2004).
35. J.D. Holladay, E.O. Jones, R.A. Dagle, G.G. Xia, C. Cao, Y. Wang, "High Efficiency and Low Carbon Monoxide Micro-scale Methanol Processors", *J.Power.Sources.* 131 [1-2] 69-72 (2004).
34. J.Jacht, C.D.Baertsch, M.May-Lozano, S.L.Soled, Y.Wang, and E.Iglesia, "Support Effects on Bronsted Acid Site Densities and Alcohol Dehydration Turnover Rates on Small Tungsten Oxide Domains", *J.Catal.* 227 (2004) 479-491.
33. Ya-Huei Chin, Yong Wang, Robert A. Dagle, and Xiaohong Shari Li, "Methanol steam reforming over Pd/ZnO: catalyst preparation and pretreatment studies" *Fuel Processing Technology* 83 193-201 (2003).
32. J. Hu, Y. Wang, D. VanderWiel, C. Chin, D. Palo, R. Rozmiarek, R. Dagle, J. Cao, J. Holladay, and E.G. Baker, "Development of fuel processing catalyst for portable power applications", *Chemical Engineering Journal* 93 55-60 (2003).
31. J.Liu, G.L.Graff, G.E.Fryxell, S.Baskaran, J.W.Virden, P.C.Rieke, A.A.Campbell, G.J.Exarhos, G.L.Mcvey, M.R.Thompson, Y.Wang, and C.H.F.Peden, "Molecularly Organized Nanocomposites and Their Applications" *Handbook of Nanophase and Nanostructured Materials* (2003), 4 211-236.
30. Holladay, Jamie; Jones, Evan; Palo, Daniel R.; Phelps, Max; Chin, Ya-Huei; Dagle, Robert; Hu, Jianli; Wang, Yong; Baker, Ed. "Miniature fuel processors for portable fuel cell power supplies", *Materials Research Society Symposium Proceedings* (2003), 756(Solid State Ionics--2002), 429-434.
29. D.R.Palo, J.D.Holladay, R.T.Rozmiarek, C.E.Cuzman-Leong, Y.Wang, J.Hu, Y.H.Chin, R.A.Dagle, E.G.Baker, "Development of a soldier-portable fuel cell power system Part I: A bread-board methanol fuel processor" *Journal of Power Sources* 108 28-34 (2002).
28. Y-H. Chin, R. Dagle, A. Dohnalkova, J. Hu, and Y. Wang, "Methanol-steam reforming over Pd/ZnO using microchannel chemical reactors", *Catalysis Today* 77 79-88 (2002).

27. Y.Wang, S.Choi, and C.H.F.Peden, "Supported Cs-heteropolyacid Salt Catalysts" **Catalysis Letters** 75[3-4] (2001) 169-173.
26. J.J.Bozell, L.Moens, D.C.Elliott, Y.Wang, G.G.Neuenschwander, S.W.Fitzpatrick, R.J.Bilski, J.L.Jarnefeld, "Production of levulinic acid and use as a platform chemical for derived products", **Resources, Conservation and Recycling**, 28(3&4) (2000) 227-239.
25. D.P.VanderWiel, J.L.Zilka, Y.Wang, A.Y.Tonkovich, and R.S.Wegeng, "Carbon Dioxide Conversions in Microreactors", *Proceedings of 4<sup>th</sup> International Conference on Microreaction Technology*, Atlanta, GA, March 5-9, 2000.
24. S.P.Fitzgerald, R.S.Wegeng, A.R.Tonkovich, Y.Wang, H.D.Freeman, J.L.Marco, F.G.Roberts, and D.P.VanderWie, "A Compact Steam Reforming Reactor for Use in an Automotive Fuel Processor", *Proceedings of 4<sup>th</sup> International Conference on Microreaction Technology*, Atlanta, GA, March 5-9, 2000.
23. J.L.Marco, A.Y.Tonkovich, M.J.LaMont, S.P.Fitzgerald, D.P.VanderWiel, Y.Wang, and R.S.Wegeng, "Compact Microchannel Fuel Vaporizer for Automotive Applications", *Proceedings of 4<sup>th</sup> International Conference on Microreaction Technology*, Atlanta, GA, March 5-9, 2000.
22. J.Liu, G.E.Fryxell, M.Qian, L.Q.Wang, and Y.Wang, "Interfacial Chemistry in Self-assembled Nanoscale Materials with Structural Ordering," **Pure Appl.Chem.**, 72 [1-2] 269-279 (2000).
21. Y.Wang, A.Y.Kim, S.Li, L.Q.Wang, C.H.F.Peden, and B.C.Bunker, "Shape-Selective Solid Acid Catalysts Based on Tungstophosphoric Acid Supported on Mesoporous Silica" *Shape Selective Catalysis-Chemicals Synthesis and Hydrocarbon Processing* pp.353-368 (2000).
20. D. C. Elliott, S. W. Fitzpatrick, J. J. Bozell, J. L. Jarnefeld, R. J. Bilski, L. Moens, J. G. Frye, Jr., Y. Wang, G. G. Neuenschwander, "Production of levulinic acid and use as a platform chemical for derived products", *Proceedings of 4<sup>th</sup> Biomass Conference of the Americas*, 2000.
19. S.Choi, Y. Wang, Z.Nie, D.Khmbapati, J.Liu, and C.H.F.Peden, "Mesoporous silica supported solid acid catalysts" **Stud.Surf.Sci.Cat.**, 130B 965-970 (2000).
18. Elliott, D. C.; Fitzpatrick, S.W.; Bozell, J.J.; Jarnefeld, J.L.; Bilski, R.J.; Moens, L.; Frye, J.G., Jr.; Wang, Y.; Neuenschwander, G.G. 1999. "Production of Levulinic Acid and Use as a Platform Chemical for Derived Products." In: *Biomass: A Growth Opportunity in Green Energy and Value-Added Products*. Volume 1, pp. 595-600, R. P. Overend and E. Chornet, eds., Elsevier Science, Ltd., Kidlington, United Kingdom.
17. S.Choi, Y.Wang, Z.Nie, J.Liu, C.H.F.Peden, "Highly Dispersed Solid Acid Catalysts" **Catalysis Today** 55 117-124 (2000).
16. A.Y.Tonkovich, J.L.Zilka, Y.Wang, M.J.LaMont, S.Fitzgerald, D.P.Vanderwiel, and R.S. Wegeng, "Microchannel Reactors for Automotive Fuel Processors", *Proceedings of the 3<sup>rd</sup> International Conference of Microreaction Technology*, Frankfurt/Main, Germany, April 18-21, 1999.
15. A.Y.Tonkovich, J.L.Zilka, M.J.LaMont, Y. Wang, and R.S. Wegeng, "Microchannel Reactors for Fuel Processing Applications. I. Water Gas Shift Reactor" **Chem.Eng.Sci.** 54 2947-2951 (1999).
14. Y.Wang and W.J.Thomson, "Characterization of the Spinel Phase in a Diphasic Mullite Gel Using Dynamic X-Ray Diffraction" **J.Mater.Sci.** 34 [15] (1999) 3577-3580.

13. A.Y.Tonkovich, J.L.Zilka, M.J.LaMont, Y.Wang, and R.S. Wegeng "Microchannel Reactors for Fuel Processing Applications. I. Water Gas Shift Reactor", *Proceedings of the 15<sup>th</sup> International Symposium on Chemical Reaction Engineering*, Newport Beach, CA, Sept. 13-16, 1998.
12. A.Y.Tonkovich, D.M.Jimenez, J.L.Zilka, M.J.LaMont, Y.Wang, and R.S.Wegeng, "Microchannel Chemical Reactors for Fuel Processing", *Proceedings of the 2<sup>nd</sup> International Conference of Microreaction Technology*, March 1998, New Orleans, Louisiana.
11. Y.Su, Y.Wang, J.L.Daschbach, T.B.Fryberger, M.A.Henderson, J.Janata, and CH.F.Peden, "Gamma-ray Destruction of EDTA Catalyzed by Titania" *J. of Advanced Oxidation Technologies*, 3 [1] 63-69 (1998).
10. P.J.Bruinsma, Y.Wang, S.Li, J.Liu, P.A.Smith, and B.C.Bunker, "The Effect of Submicron-Boehmite Particle Additions on the Properties of Micron-Gibbsite Particle Suspensions" *J. Colloid and Interfaces Science*, 192 16-25 (1997).
9. Y.Wang and W.J.Thomson, "The Influence of Steam on the Tricalcium Silicate Formation Kinetics from Sol-Gel Precursors," *J.Mater.Sci.* 31 [5] (1996) 1319-1334.
8. Y.Wang and W.J.Thomson, "Mullite Formation from Non-stoichiometric Slow Hydrolyzed Single Phase Gels," *J.Mater.Res.*, 10 [4] (1995) 912-917.
7. Y.Wang and W.J.Thomson, "The Effect of Sample Preparation on the Thermal Decomposition of CaCO<sub>3</sub>," *Thermo.Acta*, 255 (1995) 383-390.
6. Y.Wang and W.J.Thomson, "The Effects of Steam and CO<sub>2</sub> on the Kinetics of Calcite Decomposition," *Chem.Eng.Sci.*, 50 [9] (1995) 1373-1382.
5. Y.Wang, J.N.Petersen, and E.N.Kaufman, "Modeling the Biological Solubilization of Coal in A Liquid Fluidized Bed Reactor," *Appl. Biochem. Biotech.*, 51/52 (1995) 437-448.
4. E.N.Kaufman, Y.Wang, J.N.Petersen, and M.H. Little, "Experimental and Numerical Characterization of Liquid Fluidized Beds of Coal Particles," *Chem.Eng.Sci.*, 50 [23] (1995) 3703-3714.
3. Y.Wang, D.Li, and W.J.Thomson, "The Influence of Steam on Mullite Formation from Sol-Gel Precursors," *J.Mater.Res.*, 8 [1] (1993)195-205.
2. Y.Wang, A.Tong, Y.Su, and Y.Zongren "Vapor-Liquid Equilibrium of MTBE, Methanol, and 2-Butene," *Chengdu Keji Daxue Xuebao (J. of Chengdu University of Science and Technology)*, [2] (1989)1-10.
1. Y.Wang, A.Tong, and Y.Su, "Isobaric Vapor-Liquid Equilibrium for the Methanol-MTBE System," *Shiyu Huagong (J. of Petro.Chem. Eng.)*, 18 [7] (1989) 442-446.

### Issued U.S. Patents

- 110 "High-capacity, low-temperature, passive NO<sub>x</sub> and cd adsorbers and methods for making same", K.Khivantsev, S.Janos, N.R.Jaegers, L.Kovarik, F.Gao, Y.Wang, **US 11,071,966**, July 27, **2021**.
- 109 "Process for making bioabsorbed fuel additives", J.Sun, C.Liu, Y.Wang, K.Martin, P.Venkitasubramanian, **US 10,774,022**, Sept. 15, **2020**

- 108 "Process for making biobased isoprene", J.Sun, C.Liu, Y.Wang, K.Martin, P.Venkistasubramanian, **US 9,975,818**, May 22, **2018**.
- 107 "Process and apparatus employing microchannel processes technology", A.L.Tonkovich, R.Arrora, J.Brophy, F.P.Daly, S.Deshmukh, M.Fanelli, K.T.P.Jarosch, T.J.LaPlante, R.Q.Long, T.Mazanec, D.F.Ryan, L.J.Silva, W.W.Simmons, B.Stangeland, Y.Wang, T.Yuschak, S.T.Perry, J.D.Marco, M.A.Marchiando, R.D.Litt, **US 9,926,269**, March 27, **2018**.
- 106 "Process for making methacrylic acid", J.Sun, C.Liu, Y.Wang, K.Martin, P.Venkistasubramanian, **US 9,751,823**, Sept. 5, **2017**.
- 105 "Process and apparatus employing microchannel process technology", A.L.Tonkovich, R.Arrora, J.Brophy, F.P.Daly, S.Deshmukh, M.Fanelli, K.T.P.Jarosch, T.J.LaPlante, R.Q.Long, T.Mazanec, D.F.Ryan, L.J.Silva, W.W.Simmons, B.Stangeland, Y.Wang, T.Yuschak, S.T.Perry, J.D.Marco, M.A.Marchiando, R.D.Litt, **US 9,695,368**, July 4, **2017**.
- 104 "Process and catalyst for conversion of acetic acid to isobutene", J.Sun, C.Liu, Y.Wang, K.Martin, P.Venkistasubramanian, **US 9,586,194**, March 7, **2017**.
- 103 "Process and catalyst for conversion of acetic acid to isobutene and propylene", J.Sun, C.Liu, Y.Wang, K.Martin, P.Venkistasubramanian, **US 9,580,365**, Feb. 28, **2017**.
- 102 "Renewable para-xylene from acetic acid", J.Sun, C.Liu, Y.Wang, C.Smith, K.Marin, P.Venkistasubramanian, **US 9,505,671**, Nov. 29, **2016**.
- 101 "Fischer-Tropsch synthesis using microchannel technology and novel catalyst and microchannel reactor", Y.Wang, A.L.Tonkovich, T.Mazanec, F.P.Daly, D.VanderWiel, J.Hu, C.Cao, C.Kibby, X.Li, M.D.Briscoe, N.Gano, Y.Chin, **US 9,453,165**, Sept. 27, **2016**.
- 100 "Integrated reactors, methods of making same, and methods of conducting simultaneous exothermic and endothermic reactions", A.L.Tonkovich, G.Roberts, S.T.Perry, S.P.Fitzgerald, R.S.Wegeng, Y.Wang, D.VanderWiel, J.L.Marco, **U.S. 9,452,402**, Sept. 27, **2016**.
- 99 "Processes for making methacrylic acid", J.Sun, C.Liu, Y.Wang, K.Martin, P.Venkistasubramanian, **US 9,403,749**, Aug. 2, **2016**.
- 98 "Renewable isobutene and isoprene from a mixture of acetic acid and propionic acid", J.Sun, C.Liu, Y.Wang, K.Martin, P.Venkistasubramanian, **US 9,381,495**, July 5, **2016**.
- 97 "Suspended-slurry reactor", W.E.TeGrotenhuis, A.M.Karim, P.H.Humble, Y.Wang, **US 9,289,741**, March 22, **2016**.
- 96 "Renewable olefins from a mixture of acetic acid and propionic acid", J.Sun, C.Liu, Y.Wang, C.Smith, K.Martin, P.Venkistasubramanian, J.Terrian, **US 9,212,106**, December 15, **2015**.
- 95 "Integrated combustion reactor and methods of conducting simultaneous endothermic and exothermic reactions", A.L.Tonkovich, G.Roberts, S.P.Fitzgerald, P.W.Neagle, D.qiu, M.B.Schmidt, S.T.Perry, D.J.Hesse, R.J.Luzenski, G.B.Chadewell, Y.Peng, J.A.Matthias, N.P.Gano, R.Q.Long, W.A.Rogers, R.Arora, W.W.Simmons, B.L.Yang, D.J.Kuhlmann, Y.Wang, T.D.Yuschak, T.Forte, J.A.Monahan, R.Jetter, **US 9,192,929**, November 24, **2015**.
- 94 "Use of byproduct acetic acid from oxidative methods of making acrylic acid and/or methacrylic acid", J.Sun, C.Liu, Y.Wang, K.Marin, P.Venkistasubramanian, **US 9,156,746**, October 13, **2015**.



- 93 "Fischer-Tropsch synthesis using microchannel technology and novel catalyst and microchannel reactor", Y.Wang, A.L.Tonkovich, T.Mazanec, F.P.Daly, D.VanderWiel, J.Hu, C.Cao, C.Kibby, X.Li, M.D.Briscoe, N.Gano, Y.Chin, **US 9,023,900**, May 5, **2015**.
- 92 "Dimethyl ether production from methanol and/or syngas", R.Dagle, Y.Wang, E.G.Baker, J.Hu, **US 8,957,259**, February 17, **2015**.
- 91 "Selective CO methanation catalysis", R.A.Dagle, Y.Wang, G.Xia, **US 8,877,674**, November 4, **2014**.
- 90 "Process and apparatus employing microchannel process technology", A.L.Tonkovich, R.Arrora, J.Brophy, F.P.Daly, S.Deshmukh, M.Fanelli, K.T.P.Jarosch, T.J.LaPlante, R.Q.Long, T.Mazanec, D.F.Ryan, L.J.Silva, W.W.Simmons, B.Stangeland, Y.Wang, T.Yuschak, S.T.Perry, J.D.Marco, M.A.Marchiando, R.D.Litt, **US 8,747,656**, June 10, **2014**.
- 89 "Steam reforming methods and catalysts", J.M.Watson, F.P.Daly, Y.Wang, S.T.Perry, A.L.Tonkovich, S.P.Fitzgerald, L.J.Silva, R.Taha, E.A.de Alba, Y.Chin, R.Rozmiarek, X.Li, **US 8,569,202**, Oct. 29, **2013**.
- 88 "Integrated reactors, methods of making same, and methods of conducting simultaneous exothermic and endothermic reactions", A.L.Tonkovich, G.Roberts, S.T.Perry, S.P.Fitzgerald, R.S.Wegeng, Y.Wang, D.Vanderwiel, J.L.Marco. **US 8,557,186**, Oct.15, **2013**.
- 87 "Integrated combustion reactors and methods of conducting simultaneous endothermic and exothermic reactions", A.L.Tonkovich, G.Roberts, S.P.Fitzgerald, P.W.Neagle, D.Qiu, M.B.Schmidt, S.T.Perry, D.J.Hesse, R.J.Luzenski, G.B.Chadwell, Y.Peng, J.A.Mathias, N.P.Gano, R.Q.Long, W.A.Rogers, R.Arora, W.W.Simmons, B.L.Yang, D.J.Kuhlmann, Y.Wang, T.D.Yuschak, T.Forte, J.A.Monahan, R.Jetter. **US 8,383,054**, Feb. 26, **2013**.
- 86 "Steam reforming method", J.M.Watson, F.P.Daly, Y.Wang, S.T.Perry, A.L.Tonkovich, S.P.Fitzgerald, L.J.Silva, R.Taha, E.A.de Alba, Y.Chin, R.Rozmiarek, X.Li, **US 8,277,773**, Oct. 2, **2012**.
- 85 "Reactors having varying cross-section, methods of making same, and methods of conducting reactions with varying local contact time", Y.Wang, C.Cao, J.B.Kimble, L.J.Silva, **US 8,206,666**, June 26, **2012**.
- 84 Protected alloy surfaces in microchannel apparatus and catalysts, alumina supported catalysts, catalyst intermediates, and methods of forming catalysts and microchannel apparatus", B.L.Yang, A.L.Tonkovich, J.M.Watson, F.P.Daly, S.P.Fitzgerald, C.Cao, X.Li, D.Qiu, R.Taha, J.J.Ramler, Y.Wang, R.Long, Y.H.Chin, **US 8,206,597**, June 26, **2012**
- 83 "Tailored Fischer-Tropsch synthesis product distribution", Y.Wang, C.Cao, X.S.Li, D.C.Elliott, **US 8,203,023**, June 19, **2012**
- 82 "Microcombustors, microreformers, and methods involving combusting or reforming liquids", J.D.Holladay, Y.Wang, Y.Chin, M.Phelps, **US 8,197,777**, June 12, **2012**.
- 81 "Fischer-Tropsch synthesis using microchannel technology and novel catalyst and microchannel reactor", Y.Wang, A.L.Y.Tonkovich, T.Mazanec, F.P.Daly, D.VanderViel, J.Hu, C.Cao, C.Kibby, X.S.Li, M.D.Briscoe, N.Gano, Y.Chin, **US 8,188,153**, May 29, **2012**.

- 80 "Structured catalyst bed and method for conversion of feed materials to chemical products and liquid fuels", Y.Wang and W.Liu, **US 8,101,140**, Jan. 24, **2012**.
- 79 "Stable, catalyzed, high temperature combustion in microchannel, integrated combustion reactors", F.P.Daly, J.M.Watson, Y.Wang, J.Hu, C.Cao, R.Long, **US 8,062,623**, November 22, **2011**.
- 78 "Protected alloy surfaces in microchannel apparatus and catalysts, alumina supported catalysts, catalyst intermediates, and methods of forming catalysts and microchannel apparatus", B.Yang, F.P. Daly, J.M.Watson, T.Manzanec, S.P.Fitzgerald, B.R.Johnson, X.Li, C.Cao, Y.Chin, A.L.Tonkovich, R.Arora, D.J.Hesse, D.Qiu, R.Taha, J.J.Ramler, Y.Wang, R. Long, **US 7,874,432**, Jan.25, **2011**.
- 77 "Alcohol synthesis from CO or CO<sub>2</sub>", J.Hu, R.A.Dagle, J.D.Holladay, C.Cao, Y.Wang, J.White, D.C.Elliott, D.J.Stevens, **US 7,858, 667**, Dec. 28, **2010**.
- 76 "Integrated reactors, methods of making same, and methods of conducting simultaneous exothermic and endothermic reactions", A.L.Tonkovich, G.Roberts, S.T.Perry, S.P.Fitzgerald, R.S.Wegeng, Y.Wang, F.VanderWiel, J.L.Marco, **US 7,803,325**, September 28, **2010**.
- 75 "Methods of making textured catalysts", T.Werpy, J.G.Frye, Y.Wang, A.H.Zacher, **US 7,776,782**, August 17, **2010**.
- 74 "Catalysts, reactors and methods of producing hydrogen via the water-gas shift reaction", Y.Wang, A.L.Y.Tonkovich, **US 7,776,113**, August 17, **2010**.
- 73 "Methods for dehydration of sugars and sugar alcohols", J.E.Holladay, J.Hu, X.Zhang, Y.Wang, **US 7,772,412**, August 10, **2010**.
- 72 "Methods of producing hydrogen via the water-gas shift reaction over a Pd-Zn catalyst", R.A.Dagle, Y.Wang, J.Hu, **US 7,758,846**, July 20, **2010**.
- 71 "Methods of generating hydrocarbon reagents from diesel, natural gas and other logistical fuels", D.R.Herling, C.L.Aardahl, R.T.Rozmiarek, K.G.Rappe, Y.Wang, J.D.Holladay, **US 7,744,751**, June 29, **2010**.
- 70 "Method of performing sugar dehydration and catalyst treatment", J.Hu, J.E.Holladay, X.Zhang, Y.Wang, **US 7,728,156**, June 1, **2010**.
- 69 "Steam reforming methods and catalysts", J.M.Watson, F.P.Daly, Y.Wang, A.L.Tonkovich, S.P.Fitzgerald, S.T.Perry, L.J.Silva, R.Taha, E.Aceves de Alba, Y.Chin, R.Rozmiarek, X.Li, **US 7,722,854**, May 25, **2010**.
- 68 "Microchannel reactor", Y.Wang, A.L.Y.Tonkovich, T.Mazanec, F.P.Daly, D.VanderWiel, J.Hu, C.Cao, C.Kibby, X.Li, M.D.Briscoe, N.Gano, Y.Chin, **US 7,722,833**, May 25, **2010**.
- 67 "Staged alkylation in microchannels", Y.Wang, J.F.White, **US 7,708,955**, May 4, **2010**.
- 66 "Catalyst structure and method of Fischer-Tropsch synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 7,700,518**, April 20, **2010**.
- 65 "Method of forming a dianhydrousugar alcohol", J.H.Holladay, J.Hu, Y.Wang, T.A.Werpy, X.Zhang, **US 7,649, 099**, Jan. 19, **2010**.

- 64 "Chemical reactor for gas phase reactant catalytic steam reforming reactions", A.L.Y.Tonkovich, Y.Wang, S.P.Fitzgerald, J.L.Marco, G.L.Roberts, D.P.Vanderwiel, R.S.Wegeng, **US 7,632,320**, Dec. 15, **2009**.
- 63 "Two stage dehydration of sugars", J.H.Holladay, J.Hu., Y.Wang, T.A.Werpy, **US 7,615,652**, November 10, **2009**
- 62 "Catalyst structure and method of Fischer-Tropsch Synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 7,585,899**, September 8, **2009**.
- 61 "Microcombustors, microreformers, and methods involving combusting or reforming fluids", J.D.Holladay, Y.Wang, J. Hu, Y.Chin, R.A. Dagle, G. Xia, E.G.Baker, D.R.Palo, M.R. Phelps, H.Jung, **US 7,585,472**, September 8, **2009**
- 60 "Methods of conducting catalytic combustion in a multizone reactor, and a method of making a thermally stable catalyst support", F.P.Daly, J.M.Watson, Y.Wang, J.Hu, C.Cao, R.Long, R.Taha, **US 7,566,441**, July 28, **2009**
- 59 "Alcohol steam reforming catalysts and methods of alcohol steam reforming", J.D.Holladay, Y.Wang, J. Hu, Y.Chin, R.A. Dagle, G. Xia, E.G.Baker, D.R.Palo, M.R. Phelps, H.Jung, **US 7,563,390**, July 21, **2009**.
- 58 "Catalyst, method of making, and reaction using catalysts", A.L.Y.Tonkovich, Y.Wang, Y.Gao, **U.S. 7,498,001**, March 3, **2009**.
- 57 "Catalysts, reactors and methods of producing hydrogen via the water-gas-shift reaction", Y.Wang and A.L.Y.Tonkovich, **U.S. 7,488,360 B2**, February 10, **2009**
- 56 "Reforming Catalysts", Y.Wang, J.Hu, Y.Chin, R.A.Dagle, C.Cao, **US 7,470,648**, Dec. 30, **2008**
- 55 "Method of generating hydrocarbon reagents from diesel, natural gas and other logistic fuels", C.Aahdal, D.Herling, Y.Wang, J.Holladay, **US 7,435,760**, Oct.14, **2008**.
- 54 "Catalysts, in microchannel apparatus, and reactions using same", T.J.Mazanec, Y.Wang, L.J.Silva, and D.P.VanderViel, **US 7,404,936**, July 29, **2008**.
- 53 "Catalyst and method of steam reforming" Y.Wang, A.L.Y.Tonkovich, and D.P. Vanderwiel. **US 7,335,346**, February 26, **2008**
- 52 "Staged alkylation in microchannels", Y.Wang, J.F.White, **US 7,304,198**, Dec. 4, **2007**.
- 51 "Carbon nanotube-containing catalysts, methods of making, and reactions catalyzed over nanotube catalysts", Y.Wang, Y.H.Chin, Y.Gao, **US 7,288,576**, Oct 30, **2007**.
- 50 "Chemical reactor and method for gas phase reactant catalytic reactions", A.L.Y.Tonkovich, Y.Wang, S.P.Fitzgerald, J.L.Marco, G.L.Roberts, D.P.Vanderwiel, R.S.Wegeng, **US 7,288,231**, Oct. 30, **2007**.
- 49 "Methods of conducting simultaneous endothermic and exothermic reactions", A.L.Y.Tonkovich, S.P.Fitzgerald, P.W.Neagle, D.Qiu, M.B.Schmidt, S.T.Perry, D.J. Hesse, R.J.Luzenski, G.B.Chadwell, Y.Peng, J.A.Mathias, R.Q.Long, W.A.Rogers, R.Arora, W.W.Simmons, B.L.Yang, Y. Wang, T.Forte, R.Jetter, **US 7,250,151**, July 31, **2007**

- 48 "Oxidation process using microchannel technology and novel catalyst useful in same", R. Long, A.L.Y.Tonkovich, E.Daymo, B.L.Yang, Y.Wang, F.P. Daly, **US 7,226,574**, June 5, **2007**
- 47 "Alcohol steam reforming catalysts and methods of alcohol steam reforming", J.D.Holladay, Y.Wang, J.Hu, Y.H.Chin, R.A.Dagle, G.Xia, E.G.Baker, D.R.Palo, M.R.Phelps, H.Jung, **US 7,208,136**, April 24, **2007**.
- 46 "Textured catalysts, methods of making textured catalysts, and methods of catalyzing reactions conducted in hydrothermal conditions", T.A.Werpy, J.G. Frye, Jr., Y.Wang, A.H.Zacher, **US 7,186,668**, March 6, **2007**.
- 45 "Fischer-tropsch synthesis using microchannel technology and novel catalyst and microchannel reactor", Y.Wang, A.L.Y.Tonkovich, T.Mezanec, F.P.Daly, D.P.VanderViel, J.Hu, C.Cao, C.Kibby, S.Li, M.D.Brisco, N.Gano, Y.H.Chin, **US 7,084,180**, Aug.1, **2006**.
- 44 "Microcombustors, microreformers, and methods for combusting and for reforming fluids", J.D.Holladay, M.R.Phelps, Y.Wang, Y.H.Chin, **US 7,077,643**, July 18, **2006**.
- 43 "Method and Apparatus for Obtaining Enhanced Production Rate of Thermal Chemical Reactions", A.L.Y.Tonkovich, Y.Wang, R.S.Wegeng, and Y.Gao, **US 7, 045,114**, May 16, **2006**.
- 42 "Catalyst structure and method of Fischer-Tropsch Synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 7,045,486**, May 16, **2006**.
- 41 "Carbon Nanotube-Containing Structures, Methods of Making and Processes Using Same" Y.Wang, Y.Chin, Y.Gao, C.L. Aardahl, and T.L. Stewart, **US 7,011,760**, March 14, **2006**.
- 40 "Carbon nanotube-containing catalysts, methods of making, and reactions catalyzed over nanotube catalysts", Y.Wang, Y.Gao, Y.Chin, **US 7,008,969 B2**, March 7, **2006**.
- 39 "Chemical reactor for gas phase reactant catalytic reactions", A.L.Y.Tonkovich, Y.Wang, S.P.Fitzgerald, J.L.Marco, G.L.Roberts, D.P.Vanderwiel, R.S.Wegeng, **US 6,984,363**, Jan.10, **2006**.
- 38 "Catalyst structure and method of Fischer-Tropsch synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 6,982,287**, Jan. 6, **2006**.
- 37 "Methods of conducting simultaneous exothermic and endothermic reactions", A.L.Y.Tonkovich, G.L.Roberts, S.T.Perry, S.P.Fitzgerald, Y.Wang, **US 6,969,506**, Nov.29, **2005**.
- 36 "Catalyst and method of steam reforming", Y.Wang, A.L.Y.Tonkovich, D.P.VanderWiel, **US 6,958,310**, Oct. 25, **2005**.
- 35 "Reforming catalysts and methods of alcohol reforming", Y.Wang, A.L.Y.Tonkovich, J.Hu, **US 6,936,237**, Aug.30, **2005**.
- 34 "Carbon nanotube-containing structures, methods of making, and processes using same", Y.Wang, Y.Chin, Y.Gao, C.L.Aardhal, and T.L.Stewart, **US 6,824,689**, Nov. 30, **2004**.
33. "Apparatus for hydrogen separation/purification utilizing rapidly cycled thermal swing sorption", B.F.Monzyk, A.L.Y.Tonkovich, Y.Wang, D.P.VanderWiel, S.T.Perry, S.P.Fitzgerald, W.W.Simmons, J.S.McDaniel, A.E.Weller, Jr., C.M.Cucksey, **US 6,824,592**, Nov.30, **2004**.

32. "Catalyst of a metal heteropoly acid salt that is insoluble in a polar solvent on a non-metallic porous support and method of making", Y.Wang, C.H.F.Peden, S.Choi, **US 6,815,392**, Nov. 9, **2004**.
31. "Methods for separation/purification utilizing rapidly cycled thermal swing sorption", A.L.Y.Tonkovich, B.F.Monzyk, Y.Wang, D.P.VanderWiel, S.T.Perry, S.P.Fitzgerald, W.W.Simmons, J.S.McDaniel, A.E.Weller, Jr., **US 6,814,781**, Nov.9, **2004**.
30. "Catalyst, Method of Making, and Reactions Using the Catalyst", A.L.Y.Tonkovich, Y.Wang, Y.Gao, **US 6,762,149**, July 13, **2004**.
29. "Catalyst structure and method of Fischer-Tropsch synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 6,750,258**, June 15, **2004**.
28. "Catalyst and method of steam reforming", Y.Wang, A.L.Y.Tonkovich, and D.P.VanderWiel, **US 6,734,137**, May 11, **2004**.
27. "Carbon nanotube-containing catalysts, methods of making, and reactions catalyzed over nanotube catalysts", Y.Wang, Y.H.Chin, Y.Gao, **US 6,713,519**, March 30, **2004**.
26. "Methods of making pyrrolidones", T.A.Werpy, J.G. Frye, Jr., Y.Wang, A.H.Zacher, **US 6,706,893**, March 16, **2004**.
25. "Method for gas phase reactant catalytic reactions", A.L.Y.Tonkovich, Y.Wang, S.P.Fitzgerald, J.L.Marco, G.L.Roberts, D.P.VanderWiel, R.S.Wegeng, **US 6,680,044**, Jan.20, **2004**.
24. "Methods of making pyrrolidones", T.A.Werpy, J.G. Frye, Jr., Y.Wang, A.H.Zacher, **US 6,670,483**, Dec.30, **2003**.
23. "Textured catalysts, methods of making textured catalysts, and methods of catalyzing reactions conducted in hydrothermal conditions", T.A.Werpy, J.G. Frye, Jr., Y.Wang, A.H.Zacher, **US 6,670,300**, Dec.30, **2003**.
22. "Catalyst structure and method of Fischer-Tropsch synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 6,660,237**, Dec. 9, **2003**.
21. "Catalysts, reactors and methods of producing hydrogen via the water-gas shift reaction", Y.Wang and A.L.Y.Tonkovich, **US 6,652,830**, Nov. 25, **2003**.
20. "Methods of making pyrrolidones", T.A.Werpy, J.G. Frye, Jr., Y.Wang, A.H.Zacher, **US 6,632,951**, Oct.14, **2003**.
19. "Method and apparatus for obtaining enhanced production rate of thermal chemical reactions", A.L.Y.Tonkovich, Y.Wang, R.S.Wegeng, and Y.Gao, **US 6,616,909**, September 9, **2003**.
18. "Catalyst and method of steam reforming", Y.Wang, A.L.Y.Tonkovich, and D.P.VanderWiel, **US 6,607,678**, Aug.19, **2003**.
17. "Methods of making pyrrolidones", T.A.Werpy, J.G. Frye, Jr., Y.Wang, A.H.Zacher, **US 6,603,021**, Aug.5, **2003**.
16. "Converting sugars to sugar alcohols by aqueous phase catalytic hydrogenation", D.C.Elliott, T.A.Werpy, Y.Wang, and J.G.Frye, Jr., **US 6,570,043**, May 27, **2003**.

15. "Catalyst structure and method of Fischer-Tropsch synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 6,558,634**, May 6, **2003**.
14. "Method and apparatus for obtaining enhanced production rate of thermal chemical reactions", A.L.Y.Tonkovich, Y.Wang, R.S.Wegeng, Y.Gao, **US 6,540,975**, April 1, **2003**.
13. "Apparatus and methods for separation/purification utilizing rapidly cycled thermal swing sorption", A.L.Y.Tonkovich, B.F.Monzyk, Y.Wang, D.P.VanderWiel, S.T.Perry, S.P.Fitzgerald, W.W.Simmons, J.S.McDaniel, A.E.Weller, Jr., **US 6,508,862 B1**, Jan. 21, **2003**.
12. "Apparatus and methods for hydrogen separation/purification utilizing rapidly cycled thermal swing sorption", A.L.Y.Tonkovich, B.F.Monzyk, Y.Wang, D.P.VanderWiel, S.T.Perry, S.P.Fitzgerald, W.W.Simmons, J.S.McDaniel, A.E.Weller, Jr., **US 6,503,298**, Jan. 7, **2003**.
11. "Catalyst structure and method of Fischer-Tropsch synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 6,491,880**, December 10, **2002**.
10. "Active Microchannel Fluid Processing Unit and Method of Making", W.D.Bennett, P.M.Martin, D.M.Matson, G.L.Roberts, D.C.Stewart, A.L.Y.Tonkovich, Y.Wang, J.L.Zilka, S.C.Schmitt, T.M.Werner, **US 6,490,812**, December 10, **2002**
9. "Chemical reactor and method for gas phase reactant catalytic reactions", A.L.Y.Tonkovich, Y.Wang, S.P.Fitzgerald, J.L.Marco, G.L.Roberts, D.P.VanderWiel, R.S.Wegeng, **US 6,488,838**, Dec. 3, **2002**.
8. "Long life hydrocarbon conversion catalyst and method of making", A.L.Y.Tonkovich, Y.Wang, Y.Gao, **US 6,479,428**, Nov.12, **2002**.
7. "Catalyst of a metal heteropoly acid salt that is insoluble in a polar solvent on a non-metallic porous support and method of making", Y.Wang, C.H.F.Peden, S.Choi, **US 6,472,344**, Oct. 29, **2002**.
6. "Catalyst structure and method of Fischer-Tropsch synthesis", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, Y.Gao, E.G.Baker, **US 6,451,864**, September 17, **2002**.
5. "Catalyst, Method of Making, and Reactions Using the Catalyst", A.L.Y.Tonkovich, Y.Wang, Y.Gao, **US 6,440,895B1**, Aug. 27, **2002**.
4. "Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", Y.Wang, D.P.VanderWiel, A.L.Y.Tonkovich, **US 6,284,217B1**, Sep.4, **2001**.
3. "Ruthenium on Rutile Catalyst, Catalytic System, and Method for Aqueous Phase hydrogenations", D.C.Elliott, T.A.Werpy, Y.Wang, and J.G.Frye, Jr., **US 6,235,797B1**, May 22, **2001**.
2. "Active Microchannel Heat Exchanger", A.L.Y.Tonkovich, G.L.Roberts, C.J.Call, R.S.Wegeng, Y.Wang, **US 6,200,536B1**, Mar.13, **2001**.
1. "Active Microchannel Fluid Processing Unit and Method of Making", W.D.Bennett, P.M.Martin, D.M.Matson, G.L.Roberts, D.C.Stewart, A.L.Y.Tonkovich, Y.Wang, J.L.Zilka, S.C.Schmitt, T.M.Werner, **US 6,192,596**, February 27, **2001**

## Issued Foreign Patents

- 174 “一种碱性氧化物改性氮化硼催化剂及其制备方法与应用”，张朝霞，殷敏，韩沛杰，王帅，王勇，专利号： ZL 2020 1 0051324.8, 授权公告日： 2021年12月3日。 Method for the preparation of alkaline metal oxide modified boron nitride catalysts and their applications. Patent Number: ZL 2020 1 0051324.8. Chinese Patent issued on Dec. 3, 2021.
- 173 “一种利用Sn-β类催化剂同时制备甲基烯丙醇和乙缩醛的方法”，胡文达，万绍笼，王勇，专利号ZL 201710311988.7, 授权公告日： 2020年4月1日。 Method for simultaneously synthesizing methallyl alcohol and acetal on Sn-β catalysts. Patent Number: ZL 201710311988.7. Chinese Patent issued on April 1, 2020
- 172 “一种磷改性的丙烷氨氧化催化剂及其制备方法和应用”，林敬东，林锦汉，郭杰，万炎，许明亮，王勇，专利号ZL 2018 1 0386207.5, 授权公告日 2020年3月20日。 Preparation method and application of P-modified catalysts for propane ammoxidation. Patent Number: ZL 2018 1 0386207.5. Chinese Patent issued on March 20, 2020
- 171 “一种用于甲烷直接选择氧化制备甲醇、甲醛、CO的方法”，张朝霞，谈江乔，田金树，林敬东，王帅，王勇，专利号ZL 2017 1 0886455.1, 授权公告日： 2019年11月20日。 Method for direct selective oxidation of methane to produce methanol, formaldehyde and CO, Patent Number: CN107739297A. Chinese Patent issued on Nov. 20, 2019.
- 170 “一种愈创木酚制备甲酸的方法”，张朝霞，程晓杰，陈佳力，万绍隆，林敬东，王帅，王勇，专利号 CN107522611A, 授权公告日： 2019年09月29日。 Method for formic acid production from guaiacol, Patent Number: CN107522611A. Chinese Patent issued on Sept. 29, 2019
- 169 “一种通过原子置换制备高稳定性纳米催化剂的方法”，张先华，王理，刘畅，杨海亮，林敬东，王勇，专利号： CN07282048B, 授权公告日： 2019年5月10日。 Method for making highly stable catalysts using atom exchange approach, Patent Number: CN07282048B, Chinese patent issued on May 10, 2019.
- 168 “Catalyst Structure And Method Of Fischer-Tropsch Sythesis”, 1637219, Netherlands, issued on 11/29/2017
- 167 “Catalyst Structure And Method Of Fischer-Tropsch Sythesis”, 1637219, Germany, issued on 11/29/2017
- 166 “Catalyst Structure And Method Of Fischer-Tropsch Sythesis”, 1637219, Great Briain, issued on 11/29/2017
- 165 “Catalyst Structure And Method Of Fischer-Tropsch Sythesis”, 1637219, Italy, issued on 11/29/2017
- 164 “Catalyst Structure And Method Of Fischer-Tropsch Sythesis”, 1637219, European Patent Convention, issued on 11/29/2017
- 163 “Catalyst Structure And Method Of Fischer-Tropsch Sythesis”, 1637219, France, issued on 11/29/2017
- 162 “Catalyst Structure And Method Of Fischer-Tropsch Sythesis”, 2264128, European Patent Convention, issued on 10/25/2017
- 161 “Catalyst Structure And Method Of Fischer-Tropsch Sythesis”, 2264128, France, issued on 10/25/2017

- 160 "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 2264128, Italy, issued on 10/25/2017
- 159 "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 2264128, Great Britain, issued on 10/25/2017
- 158 "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 2264128, Germany, issued on 10/25/2017
- 157 "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 2264128, Netherlands, issued on 10/25/2017
- 156 "Catalyst, method of making, and reactions using the catalyst", 5,964,594, Japan, issued on 7/8/2016.
- 155 "Catalyst structure and method of Fischer-Tropsch synthesis", 5,890,380, Japan, issued on 2/26/2016
- 154 "Alcohol synthesis from CO or CO<sub>2</sub>", 2,633,330, Canada, issued on 2/10/2015.
153. "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 2,657,485, Canada, issued on 9/16/2014.
152. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 5584175, Japan, issued on 7/25/2014.
151. "Reactors having Varying Cross-Section, Methods of Making Same, and Methods of Conducting Reactions with Varying Local Contact Time", 1511561, European Patent Convention, issued on 6/25/2014.
150. "Reactors having Varying Cross-Section, Methods of Making Same, and Methods of Conducting Reactions with Varying Local Contact Time", 1511561, Germany, issued on 6/25/2014.
149. "Reactors having Varying Cross-Section, Methods of Making Same, and Methods of Conducting Reactions with Varying Local Contact Time", 1511561, Great Britain, issued on 5/25/2014.
148. "Alcohol Synthesis from CO CO<sub>2</sub>", 5551365, Japan, issued on 5/30/2014.
147. "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 5474508, Japan, issued on 2/14/2014.
146. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 5474863, Japan, issued on 2/14/2014.
144. "Staged alkylation in microchannels", 2,564,213, Canada, issued on 1/28/2014.
143. "Alcohol synthesis from CO, CO<sub>2</sub>", 2006329825, Australia, issued on 1/2/2014.
143. "Catalyst, method of making, and reactions using the catalyst", 2,396,144, Canada, issued on 11/19/2013.
142. "Reactors having Varying Cross-Section, Methods of Making Same, and Methods of Conducting Reactions with Varying Local Contact Time", 2,486,379, Canada, issued on 11/12/2013.



141. "Production of CH<sub>4</sub> using a system containing CH<sub>4</sub> concentration", ZL2011 0020934.8, China, issued on 11/6/2013.
140. "Apparatus And Method For Separation/Purification Of Fluids Utilizing Rapidly Cycled Thermal Swing Sorption", 5291855, Japan, issued on 6/14/2013.
139. "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 5265833, Japan, issued on 5/10/2013.
138. "Catalyst, Method of Making, and Reactions Using the Catalyst", 1257362, European Patent Convention, issued on 5/8/2013.
137. "Catalyst, Method of Making, and Reactions Using the Catalyst", 60147962.9, Germany, issued on 5/8/2013.
136. "Catalyst, Method of Making, and Reactions Using the Catalyst", 1257362, Great Britain, issued on 5/8/2013.
135. "Catalyst, Method of Making, and Reactions Using the Catalyst", 1257362, France, issued on 5/8/2013.
134. "Catalyst, Method of Making, and Reactions Using the Catalyst", 1257362, Netherlands, issued on 5/8/2013.
133. "生产富含CH<sub>4</sub>气体的系统以及用该系统生产富含CH<sub>4</sub>气体的方法", 王理, 孙琦, 王勇, 刘科, 专利号ZL2010 1 0516312.X, 授权公告日: 2013年02月27日。"A system producing CH<sub>4</sub> rich gaseous products and a method for producing CH<sub>4</sub> rich gaseous products using same", ZL2010 1 0516312.X, China, issued on 2/27/2013.
132. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 1204587, Great Britain, issued on 1/16/2013.
131. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", P60047795.9, Germany, issued on 1/16/2013.
130. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 1204587, France, issued on 1/16/2013.
129. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 1204587, Italy, issued on 1/16/2013.
128. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 1204587, Netherlands, issued on 1/16/2013.
127. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 1204587, European Patent Convention, issued on 1/16/2013.
126. "Active Micro-Channel Heat Exchanger", 0991465, France, issued on 12/5/2012.
125. "Active Micro-Channel Heat Exchanger", 0991465, Great Britain, issued on 12/5/2012.
124. "Active Micro-Channel Heat Exchanger", 69842906.0, Germany, issued on 12/5/2012.

123. "Active Micro-Channel Heat Exchanger", 0991465, European Patent Convention, issued on 12/5/2012.
122. "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 5111419, Japan, issued on 10/19/2012.
121. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 2,380,869, Canada, issued on 10/9/2012.
120. "Reactors having Varying Cross-Section, Methods of Making Same, and Methods of Conducting Reactions with Varying Local Contact Time", 5068005, Japan, issued on 8/24/2012.
119. "A Catalyst and Method of Steam Reforming", 2,438,714, Canada, issued on 7/17/2012.
118. "Staged Alkylation in Microchannels", ZL200580015453, P.R.China, issued on 6/20/2012.
117. "Carbon Nanotube-Containing Structures, Methods of Making, and Processes using Same", 2009200661, Australia, issued on 6/8/2012.
116. "Catalyst, Method of Making, and Reactions Using the Catalyst", 4982717, Japan, issued on 5/11/2012.
115. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", P60047180.2, Germany, issued on 5/9/2012.
114. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, Great Britain, issued on 5/9/2012.
113. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, France, issued on 5/9/2012.
112. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, European Patent Convention, issued on 5/9/2012.
111. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, Austria, issued on 5/9/2012.
110. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, Belgium, issued on 5/9/2012.
109. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, Denmark, issued on 5/9/2012.
108. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, Italy, issued on 5/9/2012.
107. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, Netherlands, issued on 5/9/2012.
106. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, Switzerland, issued on 5/9/2012.

105. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1568412, Spain, issued on 5/9/2012.
104. "Catalyst Structure And Method Of Fischer-Tropsch Synthesis", 331868, Norway, issued on 4/23/2012.
103. "Chemical Reactor And Method For Catalytic Gas Phase Reactions", 2,641,757, Canada, issued on 3/20/2012.
102. "Active Micro-Channel Heat Exchanger", 4950160, Japan, issued on 3/16/2012.
101. "Structures Containing Carbon Nanotubes and a Sporous Support, Methods of Making the Same, and Related Uses", 2,470,025, Canada, issued on 2/21/2012.
100. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 295856, Mexico, issued on 2/9/2012.
99. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 4904480, Japan, issued on 1/20/2012.
- 99 "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 2,381,221, Canada, issued on 1/17/2012.
- 98 "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 4812993, Japan, issued on 11/9/2012.
- 99 "Microcombustors, Microreformers, and Methods for Combusting and for Reforming Fluids", 2,465,253, Canada, issued on 11/1/2011.
95. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 4805501, Japan, issued on 8/19/2011.
94. "Chemical Reactor, Process for a Catalytic Chemical Reaction with at Least one Gas Phase Reactant, Process for Hydrocarbon Steam Reforming and Process of Conducting a Chemical Reaction", PI0013342-6, Brazil, issued on 5/3/2011.
93. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 2,381,156, Canada, issued on 4/19/2011.
- 89 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 330291, Norway, issued on 3/21/2011.
- 90 "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 330178, Norway, issued on 2/28/2011.
- 91 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 4669126, Japan, issued on 1/21/2011.
- 92 "Multilayered Catalyst and Method for Preparation Thereof", 4601822, Japan, issued on 10/8/2010.
- 88 "Catalyst Structure And Method Of Fischer-Tropsch Synthesis", 329355, Norway, issued on 10/4/2010.

- 87 "Methods of Making Pyrrolidones", 1412329, European Patent Convention, issued on 7/28/2010.
- 86 "Methods of Making Pyrrolidones", 1412329, France, issued on 7/28/2010.
- 85 "Methods of Making Pyrrolidones", 1412329, Great Britain, issued on 7/28/2010.
- 84 "Methods of Making Pyrrolidones", 60237157.0, Germany, issued on 7/28/2010.
- 83 "Methods of Making Pyrrolidones", 1412329, Belgium, issued on 7/28/2010.
- 82 "Methods of Making Pyrrolidones", 1412329, Netherlands, issued on 7/28/2010.
- 81 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Netherlands, issued on 4/14/2010.
- 80 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Finland, issued on 4/14/2010.
- 79 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Italy, issued on 4/14/2010.
- 78 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Switzerland, issued on 4/14/2010.
- 77 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Sweden, issued on 4/14/2010.
- 76 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Spain, issued on 4/14/2010.
- 75 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Portugal, issued on 4/14/2010.
- 74 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Austria, issued on 4/14/2010.
- 73 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, European Patent Convention, issued on 4/14/2010.
- 72 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", P60141809.3-08, Germany, issued on 4/14/2010.
- 71 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, Great Britain, issued on 4/14/2010.
- 70 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1251949, France, issued on 4/14/2010.
- 69 "Apparatus And Method For Separation/Purification Of Fluids Utilizing Rapidly Cycled Thermal Swing Sorption", 1392414, European Patent Convention, issued on 3/31/2010.
- 68 "Apparatus And Method For Separation/Purification Of Fluids Utilizing Rapidly Cycled Thermal Swing Sorption", 1392414, France, issued on 3/31/2010.

- 67 "Apparatus And Method For Separation/Purification Of Fluids Utilizing Rapidly Cycled Thermal Swing Sorption", 1392414, Great Britain, issued on 3/31/2010.
- 66 "Apparatus And Method For Separation/Purification Of Fluids Utilizing Rapidly Cycled Thermal Swing Sorption", 60235807.8, Germany, issued on 3/31/2010.
- 65 "Methods of Making Pyrrolidones", 10-0932250, Republic of Korea, issued on 12/8/2009.
- 64 "Apparatus And Method For Separation/Purification Of Fluids Utilizing Rapidly Cycled Thermal Swing Sorption", 2,446,503, Canada, issued on 11/24/2009.
- 63 "Active Micro-Channel Heat Exchanger", 4358914, Japan, issued on 8/14/2009.
- 62 "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 267940, Mexico, issued on 7/3/2009.
- 61 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 2,396,083, Canada, issued on 5/19/2009.
- 60 "Carbon Nanotube-Containing Structures, Methods of Making, and Processes using Same", 2002367020, Australia, issued on 3/5/2009.
- 59 "Chemical Reactor And Method For Catalytic Gas Phase Reactions", 2,381,154, Canada, issued on 2/3/2009.
- 58 "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 326281, Norway, issued on 11/3/2008.
- 57 "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 0835799, Republic of Korea, issued on 5/30/2008.
- 56 "Reactor and Process for Fischer-Tropsch Synthesis", 2005200564, Australia, issued on 4/24/2008.
- 55 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 2,338,576, Canada, issued on 4/15/2008.
- 54 "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 2005201074, Australia, issued on 1/31/2008.
- 53 "Microchannel Apparatus and Process Using a Microchannel Apparatus", 2005200598, Australia, issued on 12/20/2007.
- 52 "Multilayered Catalyst and Method for Preparation Thereof", 2,338,815, Canada, issued on 12/18/2007.
- 51 "Methods of Making Pyrrolidones", MY-134290A, Malaysia, issued on 11/30/2007.
- 50 "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 0716461, Republic of Korea, issued on 5/3/2007.
- 49 "Active Micro-Channel Heat Exchanger", 2,295,031, Canada, issued on 1/30/2007.

- 48 "Catalyst, Method of Making, and Reactions Using the Catalyst", 0670954, Republic of Korea, issued on 1/11/2007.
- 47 "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 0666394, Republic of Korea, issued on 1/3/2007.
- 46 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1102628, European Patent Convention, issued on 11/29/2006.
- 45 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 69934231.7, Germany, issued on 11/29/2006.
- 44 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1102628, Great Britain, issued on 11/29/2006.
- 43 "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 1102628, France, issued on 11/29/2006.
- 42 "Microcombustors, Microreformers, and Methods for Combusting and for Reforming Fluids", 1446609, France, issued on 9/20/2006.
- 41 "Microcombustors, Microreformers, and Methods for Combusting and for Reforming Fluids", 1446609, European Patent Convention, issued on 9/20/2006.
- 40 "Microcombustors, Microreformers, and Methods for Combusting and for Reforming Fluids", 1446609, Great Britain, issued on 9/20/2006.
- 39 "Microcombustors, Microreformers, and Methods for Combusting and for Reforming Fluids", 160214879.0, Germany, issued on 9/20/2006.
- 36 "Active Micro-Channel Heat Exchanger", 0566006, Republic of Korea, issued on 3/23/2006.
- 37 "Catalyst, Method of Making, and Reactions Using the Catalyst", 1206508, 03106178.8, Hong Kong, issued on 1/12/2006.
- 38 "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 1206508, Italy, issued on 11/30/2005.
- 35 "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 1206508, Netherlands, issued on 11/30/2005.
34. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 60024462.8, Germany, issued on 11/30/2005.
33. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 1206508, Great Britain, issued on 11/30/2005.
32. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 1206508, European Patent Convention, issued on 11/30/2005.
31. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 1206508, France, issued on 11/30/2005.

30. "Multilayered Catalyst and Method for Preparation Thereof", 1100618, France, issued on 9/7/2005.
29. "Multilayered Catalyst and Method for Preparation Thereof", 1100618, Great Britain, issued on 9/7/2005.
28. "Multilayered Catalyst and Method for Preparation Thereof", 69927162.2, Germany, issued on 9/7/2005.
27. "Multilayered Catalyst and Method for Preparation Thereof", 1100618, European Patent Convention, issued on 9/7/2005.
26. "Multilayered Catalyst and Method for Preparation Thereof", 1100618, Denmark, issued on 9/7/2005.
25. "Multilayered Catalyst and Method for Preparation Thereof", 1100618, Netherlands, issued on 9/7/2005.
24. "Catalyst, Method of Making, and Reactions Using the Catalyst", 2257955, Russian Federation, issued on 8/10/2005.
23. "Catalyst, Method of Making, and Reactions Using the Catalyst", ZL01804202.3, P.R.China, issued on 7/20/2005.
22. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1206316, Netherlands, issued on 6/29/2005.
21. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", P60021086.3-08, Germany, issued on 6/29/2005.
20. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1206316, Great Britain, issued on 6/29/2005.
19. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1206316, France, issued on 6/29/2005.
18. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1206316, European Patent Convention, issued on 6/29/2005.
17. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 1206316, Belgium, issued on 6/29/2005.
16. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 779528, Australia, issued on 5/26/2005.
15. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 779487, Australia, issued on 5/26/2005.
14. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 778040, Australia, issued on 3/10/2005.
13. "Catalyst, Method of Making, and Reactions Using the Catalyst", 778052, Australia, issued on 3/32005.

12. "A Method and Catalyst Structure for Steam Reforming of a Hydrocarbon", 225718, Mexico, issued on 1/21/2005.
11. "A Catalyst and Method of Steam Reforming", 2003/6076, South Africa, issued on 11/24/2004.
10. "Apparatus And Methods For Separation/Purification Utilizing Rapidly Cycled Thermal Swing Sorption", 201,424, Taiwan, issued on 11/8/2004.
9. "A Catalyst and Method of Steam Reforming", 206,889, Taiwan, issued on 11/4/2004.
8. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 1206509, European Patent Convention, issued on 10/6/2004.
7. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 1206509, Great Britain, issued on 10/6/2004.
6. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", P60014671.5-08, Germany, issued on 10/6/2004.
5. "Active Micro-Channel Heat Exchanger", 222613, Mexico, issued on 9/10/2004.
4. "Multilayered Catalyst and Method for Preparation Thereof", 218,981, Mexico, issued on 2/4/2004.
3. "Method And Apparatus For Obtaining Enhanced Production Rate Of Thermal Chemical Reactions", 218,982, Mexico, issued on 2/4/2004.
2. "Catalyst Structure And Method Of Fischer-Tropsch Sythesis", 2002/0853, South Africa, issued on 7/30/2003.
1. "A Chemical Reactor And Method For Gas Phase Reactant Catalytic Reactions", 2002/0864, South Africa, issued on 7/30/2003.

### **Selected Invited Presentations (since 2001)**

- 194 "Biomass conversion to fuels and chemicals", the 2023 Invitational Lecture Series jointly organized by UOP LLC Technical Community Organization (TCO) and Honeywell, April 4, 2023, Des Plaines, IL.
- 193 "Thermally stable single atom catalysts", 7th International Conference on Catalysis and Chemical Engineering February 20-22, 2023, Las Vegas, NV (plenary)
- 192 "Earth abundant Fe-based catalysts for biomass conversion", Cain Chemical Engineering Department, Louisiana State University, Jan. 27, 2023 (invited seminar).
- 191 "Thermally stable single atom catalysts", Monash University, Clayton, Australia, Dec. 15, 2022 (invited seminar).
- 190 "Thermally stable single atom catalysts", University of Sydney, Dec. 1, 2022 (invited seminar).
- 189 "Thermally Stable and Highly Active Single Rh Atom Catalysts (Rh1/ceria) for NO Reduction", Symposium in Honor of Norbert Kruse's Birthday, 2022 AIChE Fall Meeting, Phoenix, AZ, Nov. 13, 2022.
- 188 "Earth abundant Fe-based catalysts for hydrodeoxygenation", 2022 TSRC Catalysis workshop on theory and practice, Telluride, Co, July 25-29, 2022.



- 187 "Thermally stable single atom catalysts", 27<sup>th</sup> North American Catalysis Society Meeting, New York City, May 22-27, 2022 (keynote)
- 186 "Thermally Stable Single Atom Catalysts", Michigan Catalysis Society, Nov. 1, 2021.
- 185 "Biomass upgrading using earth abundant Fe-based catalysts", Catalysis Club of Philadelphia, Oct. 25, 2021.
- 184 "Earth abundant Fe based catalysts for hydroxyoxygenation of biomass-derived lignins" Platinum Seminar Series, Monash University, July 8, 2021
- 183 "Single atom catalysts for automotive aftertreatment", New York Catalysis Club, Oct. 21, 2020.
- 182 "Greatly Reduced Vehicle PGM Content Using Engineered, Highly Dispersed Precious Metal Catalysts", Panelist presented in Panel Discussion: Utilization of Platinum Group Metals in Emissions Control Catalysts, 2020 CLEERS Workshop, Sept 14-19, 2020.
- 181 "Low temperature methane oxidation", invited presentation to The Advanced Combustion and Emission Control (ACEC) Technical Team, May 14, 2020.
- 180 "Highly Active and Durable Single Atom Pt/CeO<sub>2</sub> Catalysts for CO oxidation", Seoul National University, Seoul, Korea, Dec. 6, 2019 (invited seminar)
- 179 "Conversion of Biomass-Derived C<sub>2</sub> and C<sub>3</sub> Oxygenates to Olefins", Korea Institute of Energy Research, Daejeon, Korea, Dec. 4, 2019 (invited seminar)
- 178 "Conversion of biomass-derived C<sub>2</sub> and C<sub>3</sub> oxygenates to fuels and chemicals", The 2<sup>nd</sup> International Symposium on Biomass Utilization Technologies, Hanzhou, China Nov. 22-24, 2019 (plenary)
- 177 "Innovative Catalytic Materials of Industrial Relevance", 2019 AIChE Annual Fall Meeting, Orlando, Nov. 13, 2019 (invited)
- 176 "Synthesis of High Metal Loading Thermally Stable Pt/CeO<sub>2</sub> Single Atom Catalysts and Activation of O<sub>2</sub> for Low Temperature CO Oxidation", Symposium on Advances in Catalysis with Ceria & Other Reducible Oxides, 2019 ACS Fall Meeting Aug 25, 2019, San Diego (keynote)
- 175 "Aldolization (C-C Coupling) of Biomass-Derived C<sub>2</sub> and C<sub>3</sub> Oxygenates", Symposium on catalytic conversion of biomass-derived oxygenates, 2019 ACS Fall Meeting, Aug. 26, 2019, San Diego (keynote)
- 174 "Opportunities and challenges with new energy sources", The 11<sup>th</sup> Global Chinese Chemical Engineers Symposium, Chengdu, China, Aug. 2-4, 2019. (Plenary)
- 173 "Highly Active and Durable Single Atom Pt/CeO<sub>2</sub> Catalysts for CO oxidation", Monash University, July 12, 2019 (invited seminar)
- 172 "Mechanistic Understanding of Methanol Carbonylation: Interfacing Homogeneous and Heterogeneous Catalysis via Carbon Supported Ir-La", 12<sup>th</sup> Natural Gas Conversion Symposium, San Antonio, June 5, 2019 (invited)
- 171 "Highly Active and Durable Single Atom Pt/CeO<sub>2</sub> Catalysts for CO oxidation", China University of Petroleum, May 16, 2019 (invited seminar)
- 170 "Highly Active and Durable Single Atom Pt/CeO<sub>2</sub> Catalysts for CO oxidation", Beijing University of Technology, May 15, 2019 (invited seminar)
- 169 "Robust supported metal catalysts", ENFL Distinguished Research Award: Symposium in Honor of Anne Gaffney, 257<sup>th</sup> ACS National Meeting in Orlando, April 4, 2019 (invited)
- 168 "Single Facet Dominated Anatase Titania Model Catalysts to Elucidate the Active Sites for O Elimination and C-C Bond Formation", 257<sup>th</sup> ACS National Meeting in Orlando, April 2, 2019 (keynote)

- 167 "Earth-abundant Fe Catalysts for Selective Hydrodeoxygenation", 257th ACS National Meeting in Orlando, April 1, 2019 (invited)
- 166 "Tailoring the activity of Pt/CeO<sub>2</sub> catalysts via high temperature synthesis", symposium In honor of Sheng Dai's ACS National Award in Separation, 257th ACS National Meeting in Orlando, March 31, 2019 (invited)
- 165 "Highly Active and Durable Single Atom Pt/CeO<sub>2</sub> Catalysts for CO oxidation", Hunan University, China, Dec. 3, 2018 (invited seminar)
- 164 "Highly Active and Durable Single Atom Pt/CeO<sub>2</sub> Catalysts for CO oxidation", Qingdao University of Science and Technology, China, Nov. 30, 2018 (invited seminar)
- 163 "Tailoring the activity of Pt/CeO<sub>2</sub> catalysts via high temperature synthesis", symposium celebrating Chuck Mims' 73<sup>rd</sup> birthday, CSChE2018, Oct. 28-31, 2018, Toronto, Canada. (invited)
- 162 "Single atom catalysis by atom trapping", Fuzhou University, Oct. 10, 2018. (invited seminar)
- 161 "Single atom catalysis by atom trapping", 59<sup>th</sup> Chemical Engineering Lecture Series, Sichuan University, Oct. 8, 2018. (invited seminar)
- 160 "Mechanistic understanding of methanol carbonylation: Interfacing homogeneous and heterogeneous catalysis via carbon supported Ir-La", 256th ACS National Meeting in Boston, MA, August 22, 2018. (keynote)
- 159 "Mechanistic understanding of C-C bond formation and O removal over Lewis acid-base pairs", 256th ACS National Meeting in Boston, MA, August 22, 2018.(invited)
- 158 "Tailoring the activity of Pt/CeO<sub>2</sub> catalysts via high temperature synthesis", 256th ACS National Meeting in Boston, MA, August 21, 2018.(invited)
- 157 "Single-facet dominant anatase TiO<sub>2</sub> (101) and (001) model catalysts to elucidate the active sites for alkanol dehydration", 256th ACS National Meeting in Boston, MA, August 20, 2018. (keynote)
- 156 "Stabilization of supported metal catalysts – atomically dispersed Pt/CeO<sub>2</sub> for CO oxidation", Catalysis Workshop, Berkshires, MA, USA, Aug. 14-17, 2018 (invited).
- 155 "Earth abundant Fe based catalysts for hydrodeoxygenation of biomass-derived phenolics", Green Chemistry Gordon Research Conference, Barcelona, Spain, July 29-Aug. 3, 2018 (invited)
- 154 "Thermally stable and regenerable single atom catalysts by atom trapping", Advancement and Prospect of Catalysis Science & Technology, University of Sydney, July 25-27, 2018 (keynote)
- 153 "Thermally Stable and Regenerable Single Atom Catalysts by Atom Trapping", Fudan University, July 13, 2018 (invited seminar)
- 152 "Thermally Stable and Regenerable Single Atom Catalysts by Atom Trapping", Arizona State University, April 16, 2018 (invited seminar)
- 151 "Understanding and Design of Metal Based Catalysts", 2018 ACS Spring Meeting, Symposium in honor of Yong Wang's I&EC Division Fellow Award, New Orleans, March 18, 2018.
- 150 "Stabilization and Activation of Single Atom Pt/CeO<sub>2</sub> Catalysts for Low Temperature CO Oxidation", US DOE Advanced Engine Crosscut Meeting, Detroit, US, Jan. 11, 2018 (invited)
- 149 "Earth-abundant Fe Catalysts for the Conversion of Biomass", Shanghai University of Engineering Technology, Shanghai, China, Dec. 1, 2017 (invited seminar)
- 148 "Highly Stable and Active Supported Metal Catalysts for CO Oxidation", SUCE 2017 (Sino-US Chemical Engineering Conference), Beijing, China, Oct. 18, 2017 (keynote)
- 147 "Low Temperature Emission Abatement to Enable Advanced Engines", 18<sup>th</sup> National Congress of Catalysis, Tianjin, China, Oct. 17, 2017 (keynote)

- 146 "Precious Metal Promoted Fe Catalysts for Hydrodeoxygenation of Phenolics", ShanXi Normal University, Xi'an, China, Oct. 13, 2017 (invited seminar)
- 145 "Hydrothermally Stable Pt/CeO<sub>2</sub> Catalysts for Low Temperature CO Oxidation", 2017 Europacat, Florence, Italy, Aug. 28, 2017.
- 144 "Single Facet Nano-shaped Materials as Model Catalysts for Alcohol Conversion", 2017 ACS Fall Meeting, DC, Aug. 21, 2017 (invited)
- 143 "Cascade Adolization and Self-deoxygenation over Zn<sub>x</sub>Zr<sub>y</sub>O<sub>z</sub> Mixed Oxides", 2017 ACS Energy & Fuels Storch Award Symposium in honor of Umit S. Ozkan, DC, Aug. 20, 2017.
- 142 "Innovations in Catalysis and Reaction Engineering for Thermochemical Conversion of Biomass-derived Intermediates to Fuels/Chemicals", Central South University of Nationalities, Wuhan, China, May 25, 2017 (invited seminar)
- 141 "Low Temperature Emission Abatement to Enable Advanced Engines", 2017 MCARE – Materials Challenges in Alternative and Renewable Energy, Jeju, Korea, Feb. 20-24, 2017 (Keynote)
- 140 "Transition Metal Oxide and Bimetallic Catalysts: From Fundamental to Applications", USSABIC, Houston, Feb. 14, 2017 (invited seminar)
- 139 "Innovations in Catalysis and Reaction Engineering for Thermochemical Conversion of Biomass-derived Intermediates to Fuels/Chemicals", College of Chemistry, Zhejiang University, Dec. 16, 2016 (invited seminar)
- 138 "Thermochemical Conversion of Biomass to Fuels/Chemicals", Southwest University of Petroleum, Sept. 30, 2016 (invited seminar).
- 137 "Catalytic Conversion of Oxygenates on Early Transition Metal Oxides", Sichuan University, Sept. 28, 2016 (invited seminar).
- 136 "Catalytic Conversion of Biomass-derived Oxygenates to Olefins for Fuel and Chemical Production", 3rd Solar Fuels I-CORE Workshop, Sept. 12-15, 2016, Nahsholim, Israel (keynote)
- 135 "Fundamental Understanding of Bimetallic and Acid-base Catalysis for the Upgrading of Biomass-derived Feedstocks", University of Delaware, Sept. 2, 2016. (invited seminar)
- 134 "Thermochemical conversion of biomass to fuels/chemicals", 252<sup>nd</sup> ACS National Meeting, Symposium for Catalysts and Catalytic Technologies for Conversion of Biomass and Its Derivatives of Division of Catalysis Science and Technology, Philadelphia, Aug.22, 2016 (keynote)
- 133 "Fundamental Understanding of Acid-Base Catalysis for the Upgrading of Biomass-derived Feedstocks", 252<sup>nd</sup> ACS National Meeting, Biomass symposium of Division of Energy and Fuels, Philadelphia, Aug.21, 2016 (keynote)
- 132 "Conversion of oxygenates on early transition metal oxides", 252<sup>nd</sup> ACS National Meeting, Mixed Oxide Catalysts Symposium of Division of Catalysis Science and Technology, Philadelphia, Aug. 21, 2016 (keynote)
- 131 "Fundamental Understanding of ZnO Doped ZrO<sub>2</sub> Surface for C-C Bond Formation and Deoxygenation of Biomass-derived Oxygenates", Post 16<sup>th</sup> ICC Symposium on Conversion of Energy Molecules, Xiamen University, July 11-12, 2016 (keynote).
- 130 "Mechanistic Understanding of Fe-based Catalysts for Hydrodeoxygenation of Biomass-derived Phenolics", 16<sup>th</sup> International Congress of Catalysis, Beijing, China, July 2-9, 2016 (invited)
- 129 "Synergistic Catalysis of Fe Based Bimetallic Catalysts for Hydrodeoxygenation of Lignin Derived Compounds", Gordon Research Conference, June 22-26, 2016 (keynote)
- 128 "Fundamental Understanding of ZnO Doped ZrO<sub>2</sub> Surface for C-C Bond Formation and Deoxygenation of Biomass-derived Oxygenates", 251<sup>st</sup> ACS National Meeting, Mixed Metal Oxide

- Symposium of Division of Catalysis Science and Technology, San Diego, March 14, 2016 (keynote).
- 127 "Rational Design of  $Zn_xZr_yO_z$  Catalysts for the Conversion of Ethanol to Isobutene with Improved Selectivity and Stability", 251<sup>st</sup> ACS National Meeting, I&EC: Industrial & Engineering Fellow: Symposium in honor of Bala Subramaniam, San Diego, March 13, 2016 (invited)
  - 126 "Conversion of Biomass to Fuels/Chemical: Status and Perspectives", Hong Kong University of Science and Technology, March 5, 2016 (invited seminar).
  - 125 "Synergistic catalysis of Fe based bimetallic catalysts for hydrodeoxygenation of lignin derived compounds", Sustainable Conversion of Lignin to Value-Added Products and Green Chemicals Symposium, Pacificchem 2015, Honolulu, Hawaii, Dec.15-20, 2015.
  - 124 "Innovation in catalysis and reaction engineering for the conversion of biomass intermediates to fuels", 5<sup>th</sup> Asia-Pacific Forum on Renewable Energy, Jeju, Korea, Nov.4-7, 2015
  - 123 "Upgrading of biomass-derived feedstocks", Oak Ridge National Laboratory, Oct. 23, 2015.
  - 122 "Fundamentals of selective oxygen removal from biomass intermediates", Department of Chemistry, University of Tennessee, Knoxville, Oct. 22, 2015.
  - 121 "Innovations in catalysts and reaction engineering for thermal chemical conversion of biomass-derived intermediates to chemicals and fuels", 65<sup>th</sup> Canadian Chemical Engineering Conference, Calgary, AB, Oct. 4-7, 2015.
  120. "Selective hydrogenation: current status, challenges and future direction", Nike, Beaverton, Oregon, Aug. 28, 2015.
  119. "Bimetallic Pt-M catalysts for aqueous phase reforming of glycerol", Symposium on innovative chemistry & electrocatalysts for low-carbon energy & fuels: discovery to application, 250<sup>th</sup> ACS Fall meeting, Boston, MA, Aug. 16-20, 2015.
  118. "Rational design of  $Zn_xZr_yO_z$  catalyst for direct conversion of biomass-derived oxygenates to olefins", Catalysis by Mixed Oxides symposium, 250<sup>th</sup> ACS Fall meeting, Boston, MA, Aug. 16-20, 2015.
  117. "Elucidation of the roles of support for selective oxidation of hydrocarbons on VO<sub>x</sub> catalysts", Free University of Brussels, Brussels, July 17, 2015.
  116. "Molecular active sites in heterogeneous Ir-La/C catalyzed carbonylation of methanol to acetates", E.V.Murphree Award in Industrial & Engineering Chemistry: Symposium in Honor of Joseph R. Zoeller, 2015 ACS Spring Meeting, Denver, March 25, 2015.
  115. "Synergistic catalysis between Fe and precious metals for hydrodeoxygenation of phenolics", Department of Chemistry, Fuzhou University, Fuzhou, China, March 16, 2015.
  114. "Heterogenization of homogeneous Ir based catalysts for methanol carbonylation", School of Chemical Engineering, Sichuan University, Jan. 20, 2015 (invited seminar).
  113. "Synergistic catalysis between Fe and precious metals for hydrodeoxygenation of phenolics", The 1<sup>st</sup> International Symposium on Catalytic Science and Technology in Sustainable Energy and Environment (EECAT2014), Tianjin, China, Oct. 8-10, 2014. (Invited)
  112. "Catalysis in aqueous phase: reforming of glycerol", School of Chemical Engineering, Tianjin University, Oct. 8, 2014. (invited seminar).
  111. "Thermochemical conversion of carbon source intermediates: syngas to fuels", Dalian Institute of Chemical Physics, Dalian, Aug. 23, 2014. (invited).

110. "Role of HZSM-5 in converting syngas derived alcohols and oxygenates to hydrocarbon fuels", Biofuels for powering the world symposium, 248<sup>th</sup> ACS meeting, San Francisco, Aug. 12, 2014 (invited).
109. "Hydrodeoxygenation of phenolics via noble metal promoted Fe catalysts: a combined experimental and theoretical investigation", Catalysis for biomass conversion symposium, 248<sup>th</sup> ACS Meeting, San Francisco, Aug. 12, 2014. (invited)
108. "Synergistic effects between Pd and Fe for selective hydrodeoxygenation of lignin-derived compounds", School of Chemical Engineering, Tianjin University, July 16, 2014. (invited seminar).
107. "Vox/CeO<sub>2</sub> catalysts for oxidative dehydrogenation (ODH) of methanol – effects of CeO<sub>2</sub> facets", School of Chemical Engineering, Tianjin University, July 15, 2014. (invited seminar).
106. "Recent catalysis research at Wang Group", College of Chemical Engineering, Beijing University of Chemical Technology, Beijing, July 14, 2014. (invited seminar).
105. "Innovations in catalysis and reaction engineering for thermal chemical conversion of biomass-derived intermediates to fuels/chemicals", College of Life Sciences and Technology, Beijing University of Chemical Technology, Beijing, July 14, 2014. (Invited seminar)
104. "Recent catalysis research at Wang Group", School of Chemical Engineering, Sichuan University, July 2, 2014. (invited seminar).
103. "Innovations in catalysis and reaction engineering for thermal chemical conversions of biomass-derived intermediates to chemicals", Provost Bold Aspiration Lecture Series, University of Kansas, Feb. 17, 2014 (invited lecture).
102. "Mechanistic insights on Pd-Fe bimetallic catalysts for hydrodeoxygenation of lignin-derived compounds", joint Japan-China workshop in catalysis, Jan. 6, 2014 (invited)
101. "Thermal-chemical conversion of biomass to fuels", 3<sup>rd</sup> Sino-US Advanced Biofuels Forum, Beijing, China, Dec. 9-10, 2013 (invited).
100. "Conversion of biomass derivatives to fuels/chemicals", 7<sup>th</sup> Sino-US Chemical Engineering Conference, Beijing, China, Oct. 14-18, 2013 (keynote).
99. "Carbon supported bimetallic Pd-Fe catalysts for vapor-phase hydrodeoxygenation of guaiacol", ACS Fall Meeting, Indianapolis, Sept. 8-12, 2013 (keynote).
- 100 "Conversion of biomass derivatives to fuels and chemicals", ACS Fall Meeting, Indianapolis, Sept. 8-12, 2013 (keynote).
- 101 "Catalytic conversion of biomass intermediates to fuels and chemicals", Leibnitz of Catalysis, Rostock, Germany, Aug.30, 2013 (invited seminar).
96. "Biomass derivatives to fuels and chemicals", Xiamen University, Xiamen, China, April 27, 2013 (invited seminar).
95. "Conversion of biomass derivatives to fuels and chemicals", East China University of Science and Technology, Shanghai, China, April 24, 2013 (invited seminar).
94. "Thermochemical conversion of biomass intermediates to fuels/chemicals", Symposium in honor of Anne Gaffney as a recipient of the ACS Industrial Chemistry Award, 2013 ACS Spring Meeting, New Orleans, April 7-11, 2013.
- 93 "Catalyst design for biomass conversion to fuels and chemicals", PNNL, Dec. 4, 2012 (invited).
- 94 "Thermochemical conversion of carbon source intermediates: syngas to fuels", 2012 Asia-Pacific Forum on Renewable Energy, Jeju, Korea, Nov. 26-29, 2012 (keynote).

- 95 "Ethanol conversion on ZrO<sub>2</sub>: the roles of Lewis and Bronsted sites", 2012 AIChE Fall Meeting, Oct. 28-Nov.1, 2012.
- 96 "Hydrodeoxygenation of biomass-derived compounds to biofuels", 2012 AIChE Fall Meeting, Symposium in honor of Prof. Enrique Iglesia, Pittsburgh, Oct. 28-Nov. 1, 2012 (invited).
- 89 "Plasma treated Ni/SiO<sub>2</sub> methanation catalysts", 2012 International Symposium on Plasma for Catalyses and Energy Materials", Tianjin, China, Sept. 22-24, 2012 (plenary).
- 88 "Vapor phase hydrodeoxygenation of biomass derived compounds to biofuels", 2012 ACS Fall meeting, symposium honoring Umit Ozkan, Philadelphia Aug. 22, 2012 (invited).
- 87 "Overview of the conversion of biomass intermediates to fuels/chemicals", Tsinghua University, June 21, 2012 (invited seminar).
- 86 "Biomass conversion to fuels/chemicals", Beijing University, June 12, 2012 (invited seminar).
- 85 "Thermochemical conversion of biomass intermediates to fuels/chemicals", 2012 spring symposium of Catalysis Club of Chicago, Naperville, IL, May 15, 2012. (Plenary)
- 84 "Hydrogen production from biomass", DOE H<sub>2</sub> Production Expert Panel, DC., May 11-12, 2012 (invited).
- 83 "Nanostructured catalysts for energy conversion applications", Symposium on Materials for Catalysis in Energy, 2012 MRS Spring Meeting, San Francisco, April 12, 2012 (keynote).
- 82 "Investigation of active sites for ethanol conversion", Gabor A. Somorjai Award for Creative Research in Catalysis and the George A. Olah Award in Hydrocarbon or Petroleum Chemistry: Symposium in Honor of Enrique Iglesia and James A. Dumesic, 2012 ACS Spring Meeting, San Diego, March 28, 2012 (invited).
- 81 "Thermochemical conversion of biomass intermediates to fuels/chemicals", Symposium on Fuels, Chemicals, Materials, and Energy from Biomass, Coal, Natural Gas, and Other Natural Resources, 2012 ACS Spring Meeting, San Diego, March 26, 2012 (keynote).
- 80 "Metal oxide promoted catalysts for clean energy conversion", Symposium on Catalysis for Clean Energy Technologies, 2012 ACS Spring Meeting, San Diego, March 28, 2012 (keynote).
- 79 "Nanostructured catalysts: application for renewable biomass conversion and PEM fuel cells", Xiamen University, March 19, 2012, China (invited seminar).
- 78 "Thermochemical conversion of biomass intermediates to fuels/chemicals", Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences, March 17, 2012 (invited seminar).
- 77 "Ethanol steam reforming: active sites for Co based catalysts", Tianjin University, March 10, 2012 (invited seminar).
- 76 "Conversion of bio-derived intermediates to fuels/chemicals", 2011 Washington Future Energy Conference, Seattle, Oct. 18-19, 2011 (invited).
- 75 "Conversion of bio-ethanol to isobutene", Decatur, IL, September, 2011 (Invited seminar at ADM).
- 74 "Conversion of bio-ethanol to fuels and chemicals", Symposium in honor of Chunshan Song's award, ACS Fall Meeting, Denver, Aug. 29, 2011 (invited).
- 73 "One step conversion of bio-ethanol to isobutene", Tianjin University, Aug. 15, 2011 (invited seminar).
- 72 "Nanostructured catalysts: applications for renewable biomass conversion and PEM fuel cells", Sichun University, Chengdu, China, Aug. 11, 2011.

- 71 "Aqueous phase conversion of biomass to hydrogen", Symposium of Challenges in Environmental Catalysis, PacifiChem, Honolulu, Dec. 17, 2010 (invited)
- 70 "Roles of Pt-Re catalysts in biomass conversion", ACS Fall Meeting, Boston, Aug., 2010. (Keynote)
- 69 "Direct conversion of ethanol to isobutene", ACS Fall Meeting, Boston, Aug., 2010. (Keynote)
- 68 "Conversion of Biomass to Fuels and Chemicals", Orcas 2010 Conference, San Juan Islands, Sept 19-22, 2010 (Keynote).
- 67 "Overview of biomass conversion", WTIA Program, Seattle, June 3, 2010 (first WSU presenter invited to speak at a WTIA program).
66. "Biomass conversion to fuels and chemicals", Korean Catalysis Society Conference, Pushan, June 2010 (Plenary)
- 65 "Perspective on biofuels from biomass", Annual EPSCoR Conference, Oklahoma City, OK, April 29-30, 2010 (Plenary).
- 64 "Biomass conversion to fuels and chemicals", Dept. of Chemical Engineering, University of Oklahoma, April 29, 2010. (invited seminar).
- 63 "Hydrogen production from bio-derived liquids", Dept. of Chemical Engineering, University Pennsylvania, Philadelphia, March 31, 2010. (invited seminar)
- 62 "Synthesis and fundamental understanding of catalytic materials for sustainable energy", 2010 ACS Spring Meeting, San Francisco, March 21-25, 2010 (keynote)
- 61 "Bimetallic catalysts for reforming of bio-derived liquids", 2010 ACS Spring Meeting, San Francisco, March 21-25, 2010 (keynote)
- 60 "Biomass conversion to fuels and chemicals", International Symposium on Sustainable Energy: Challenges and Opportunities (ISSE2010), Beijing, China, Feb. 7-8, 2010 (plenary).
- 59 "DOE perspective on biofuels from biomass", International Seminar for Bioenergy & Biofuels, Beijing, China, Dec, 3<sup>rd</sup>, 2009 (plenary).
- 58 "Microchannel enabled process intensification for distributed production of chemicals and fuels", 2009 AIChE meeting, Nashville, Tennessee, Nov.8-13, 2009 (invited)
- 57 "Collaborative initiatives of PNNL with China in clean energy conversion", 2009 AIChE meeting, Nashville, Tennessee, Nov.8-13, 2009 (invited).
- 56 "Preparation and characterization of nano-dispersed early transition metal oxide catalysts", The 5<sup>th</sup> Sino-US Joint Conference of Chemical Engineering, Beijing, China, Oct. 12-16, 2009 (invited).
- 55 "Catalytic conversion of biomass to fuels and chemicals: hydrogen production from bio-derived liquids on bimetallic catalyst", The 5<sup>th</sup> Sino-US Joint Conference of Chemical Engineering, Beijing, China, Oct. 12-16, 2009 (invited).
- 54 "Bimetallic catalysts for hydrogen production from bio-derived liquids", 17<sup>th</sup> International Material Research Conference, Cancun, Mexico, Aug. 17-21, 2009 (Keynote).
- 53 "Overview of biomass conversion to fuels and chemicals", Department of Material Engineering, University of Washington, June 1, 2009 (invited seminar).
- 52 "Biomass to fuels and chemicals", invited lecture to Chicago Catalysis Society, April 13, 2009. (invited)
- 51 "Overview of thermochemical conversion of biomass to fuels", Voiland School of Chemical Engineering and Bioengineering, Washington State University, Feb.9, 2009 (invited seminar)
- 50 "Catalysis in biomass conversion", Technical University of Munich, Munich, Germany, Oct. 30, 2008 (invited seminar).

- 49 "Fuels and chemical production using microchannel reaction technologies", 2008 International Workshop on Process Intensification, Tokyo, Japan, Oct. 15-18, 2008 (Keynote)
- 48 "Overview of biomass conversion to fuels and chemicals", International Symposium on Catalysis for Ultra Clean Fuels, Dalian, China, July 21-24, 2008. (keynote)
- 47 "Structural and Functional Relationship of Early Transition Metal Oxides", 14<sup>th</sup> International Congress of Catalysis, Seoul, Korea, July 11, 2008 (invited)
- 46 "Bimetallic catalysts for steam reforming of alcohols", Nano Catalysis: Fundamentals and Applications, Dalian, China, July 9-11, 2008 (invited)
- 45 "Steam reforming for hydrogen production on bimetallic catalysts", ChE Department, Sichuan University, June 16, 2008. (invited seminar)
- 44 "Roles of catalysis in conserving fossil resources", International Material Research Society Meeting, Chongqing, China, June 9-12, 2008 (Keynote)
- 43 "Catalytic conversion of biomass to fuels and chemicals", ChE Department, University of Minnesota, May 23, 2008.
- 42 "Hydrogen production from bio-derived liquids", 2008 Purdue Hydrogen Symposium, Purdue University, April 23-25, 2008 (Keynote)
- 41 "Overview of biomass to hydrogen production", 2008 ACS Symposium on Hydrogen Production, New Orleans, March, 2008 (Keynote)
- 40 "Overview of PNNL's activities in catalytic conversion of biomass to fuels and chemicals", Lummus Technology, Bloomfield, NJ, Feb. 17, 2008.
- 39 "Overview of catalytic conversion of biomass to fuels and chemicals", ConocoPhillips, Bartlesville, OK, Jan. 15, 2008.
- 40 "Catalytic conversion of biomass to fuels and chemicals", Eastman Corporate Seminar series, Kingsport, TN, Jan. 8, 2008.
- 41 "Overview of catalytic conversion of biomass to fuels and chemicals", 4<sup>th</sup> Joint Japan-China Chemical Engineering Conference, Dec. 19-21, 2007 (Plenary)
- 36 "Overview of biomass conversion to fuels and chemicals", invited lecture to Michigan Catalysis Society, Oct. 16, 2007.
35. "Catalytic processes for biomass conversion to fuels and chemicals: an overview", 2007 symposium on biomass conversion and environmental catalysis organized by Japan Science and Technology, Catalysis Research Center, Hokkaido University, July 13-14, Sapporo, Japan. (Plenary lecture).
34. "Alcohol steam reforming for hydrogen production", Tshinghua University, April 26, 2007, Beijing, China.
33. "Fundamental understanding of bimetallic catalysts for alcohol steam reforming", Tianjin University, April 24, 2007, Tianjin, China.
32. "Hydrogen production from alcohol steam reforming", Dalian Institute of Chemical Physics, April 19, 2007, Dalian, China.
31. "Bimetallic catalysts for alcohol steam reforming", Fudan University, April 16, 2007, Shanghai, China
30. "Bimetallic steam reforming catalysts for hydrogen production", Argonne National Laboratory, March 23, 2007.
29. "Challenges in Hydrogen Production", invited seminar at Korea University, Nov. 7, 2006.



28. "Steam reforming catalysts in microchannel reactors for hydrogen production", invited seminar at Seoul National University, Nov. 6, 2006.
27. "Hydrogen Production via Bio-derived Liquids Reforming", U.S. Department of Energy Bio-Derived Liquids to Hydrogen Distributed Reforming Workshop, October 24, 2006, Baltimore, Maryland
26. "Alcohol Steam Reforming for Hydrogen Production", invited presentation in 2006 Annual Pacific Coast Catalysis Society Meeting, September 8, 2006.
25. "Process Minutization Using Microchannel Reactors", invited seminar at Oak Ridge National Laboratory, May 19, 2006.
24. "Process Intensification Using Microchannel Reactors", invited seminar at Sichuan University, China, April 30, 2006.
23. "Overview of Hydrogen Production", 2006 Green Chemistry Lecture, Tianjin University, China, April 28, 2006.
22. "Overview of Catalysis Research at PNNL", invited seminar at Dalian University of Technology, Dalian, China, April 27, 2006.
21. "Opportunities in Process Intensification Using Microchannel Reactor Technology", invited to 2006 DICP Symposium, Dalian Institute of Physical Chemistry, Dalian, China, April 21, 2006.
20. "Overview of Microreactor and Process Intensification", Keynote Address in 2006 AIChE Spring Annual Meeting, Orlando, April, 2006.
19. "Aqueous Phase Reforming of Biomass for Hydrogen Production", 2006 ACS Spring Meeting, Atlanta, March 26, 2006.
18. "Hydrogen Production from Non-Nuclear Sources", Keynote Address in Hydrogen Production Workshop organized by National Tsing Hua University, Taiwan, Dec.14, 2005.
17. "Process Intensification Using Microchannel Technology – Link of Catalysis and Reaction Engineering", invited seminar at Washington State University, Pullman, Dec.5, 2005.
16. "Catalysis Research Overview at PNNL", invited seminar at Dalian Institute of Chemical Physics, Dalian, China, Oct. 14, 2005.
15. "Steam Reforming of Hydrocarbon Fuels for Hydrogen Production." Third China-US-Japan Chemical Engineering Conference, Beijing, China on October 13, 2005.
14. "Catalysis at PNNL: The Newly Established Institute for Interfacial Catalysis." Invited seminar at the Institute of Coal Chemistry, Taiyuan, China on October 9, 2005.
13. "Steam reforming of alcohols for hydrogen production," ACS 2005 Fall Meeting, Washington DC, DC on August 29, 2005.
12. "Process Intensification of Gas-To-Liquids Fischer-Tropsch Synthesis Using Microchannel Reactors", 229<sup>th</sup> ACS George A.Olah Award Symposium in Honor of Enrique Iglesia, San Diego, CA, March 13-15, 2005.
11. "Characterization and activity of PdZn based catalysts for microchannel fuel processing applications", 1<sup>st</sup> Pacific Coast Catalysis Conference, Berkeley, CA, March 11., 2005.
10. "Process Intensifications – Opportunities with Microchannel Reaction Technology", Brigham Young University, Provo, UT, February 5, 2004.
9. "Process Intensification Using Microchannel Reactors", University of New Mexico, Albuquerque, NM, Oct. 7, 2003.

8. "Some Aspects on Catalysis and Reaction Engineering Research at PNNL", Sandia National Laboratory, Albuquerque, NM, Oct.6, 2003.
7. "Steam Reforming Catalysts for Microchannel Reactors", ACS Microreaction Engineering and Process Intensification Symposium, New York City, Sept.8-9, 2003.
5. "Intensification of Fischer-Tropsch Synthesis Using Microchannel Reactors", Catcon2003, Houston, May 5-6, 2003.
5. "Process Intensification Using Microchannel Reactors", The University of Kansas, Lawrence, April 30, 2003.
4. "Microchannel Fuel Processors for Manportable and Subwatt Power Generations", Korean Institute of Science and Technology, Feb. 26, 2002.
3. "Fuel Processors Based on Microchannel Technology", 1st International Symposium on Ultracompact Chemical Process Systems, Seoul, Korea, Feb. 25-26, 2002.
2. "Functionalization of Acidic Groups on MCM-41 Silica", 1<sup>st</sup> International Catalysis Workshop for Young Scientists, Beijing, China, Sept. 24-28, 2001.
1. "Microchannel Catalytic Reactors for Fuel Cell Fuel Processing Applications", Dept of Chem. Eng., University of California at Berkeley, March 9, 2001.

### **Books Edited**

2. Bo Zhang and Y.Wang, *Biomass Processing, Conversion, and Biorefinery*, Nova Science Publishers, Inc., ISBN: 978-1-62618-346-9, 2013.
1. Y.Wang and J.Holladay, *Microreactor Technology and Process Intensification*, ACS publisher, vol 914, 2005.

### **Special Journal Issues Edited**

6. Guest editor of a special issue of *Catalysis Today* on Catalysts and Energy Materials for a Low Carbon Economy, issue 233, 2014
5. Guest editor of a special issue of *Catalysis Today* on Catalysis for Biomass Conversion, issue 237, 2014
4. Guest editor of a special issue of *Catalysis Today* on Catalysis Chemicals and fuels from renewables, 2010
3. Guest editor of a special issue of *Catalysis Today* on Catalysis and Chemistry of Chemical and Fuel Synthesis, 2008
2. Guest editor of a special issue of *Catalysis Today* on Compact and Novel Reactors, 2006
1. Guest editor of a special issue of *Journal of Power Sources* on Hydrogen Production, 2006

### **Graduate Students/Postdocs Supervised** (16 PhD students graduated, 31 postdocs trained, 7 MS students graduated)

Weixin Huang, Postdoc (University of North Dakota, 2022)

Austin Winkelman, PhD (PNNL, 2022)

Dong Jiang, Postdoc (Dow Chemical, 2022)

Junming Sun, Postdoc (Clariant, 2022)

Berlin Suddeth, PhD (2022)  
Zihao Zhang, Postdoc (Paul Scherrer Institut, 2021)  
Yixiao Li, Postdoc (BASF, 2021)  
Houqian (Frank) Li, PhD (University of Wisconsin, 2021)  
Shuoxun (Ashley) Wang, Postdoc (Boehringer Ingelheim, 2020)  
Jianghao Zhang, PhD (Chinese Academy of Sciences, 2020)  
Nick Kaylor, Postdoc (Southwest Research Institute, 2019)  
Nick Jaegers, PhD (UC Berkeley, 2019)  
Xavier Isidro, Pereira-Hernandez, PhD (PNNL, 2019)  
Jinshu Tian, PhD (Zhejiang University of Technology, 2019)  
Hannah Kim, MS (WSU, 2019)  
Bo Peng, Postdoc (Sinopec, 2018)  
Fan Lin, Postdoc (PNNL, 2018)  
Dongmin Yun, Postdoc (SK Innovation, 2018)  
Mingwu Tan, Postdoc (a\*STAR, 2018)  
Yan Wang, PhD (National University of Singapore, 2018)  
Zizwe Chase, PhD (faculty of University of Illinois at Chicago, 2018)  
Lei Nie, Postdoc (Tianjin University of Technology, 2018)  
Yingwen Cheng, Postdoc (faculty of Northern Illinois University, 2017)  
James Song, MS (WSU, 2017)  
Rebecca A. L. Baylon, PhD (Alturas Analytics Inc., 2016)  
Yongchun Hong, PhD (University of California, Berkeley, 2016)  
Mahfuzur Rahman, MS (WSU, 2016)  
Yuan Chen, Postdoc (Fuji, 2016)  
Jamie Holladay, PhD (PNNL, 2015)  
Ning Yu, MS (University of California, Riverside, 2015)  
Stephen Davidson, PhD (PNNL, 2015)  
Yan Li, PhD (Agilent, 2015)  
Zhehao Wei, PhD (Johnson Matthey, 2015)  
Weizhen Li, Postdoc (DICP, 2015)  
Changjun Liu, Postdoc (faculty of Sichuan University, 2013)  
Oscar Marin Flores, Postdoc (WSU, 2013)  
Karthi Ramasamy, PhD (PNNL, 2013)

Colin Smith, MS (PNNL, 2013)  
Prashant Daggolu, Postdoc (Cummins, 2012)  
Dachuan Shi, Postdoc (ConocoPhillips, 2012)  
Sehkyu Park, Postdoc (faculty of Kwangwoon University, 2012)  
Feng Gao, Research assistant professor (PNNL, 2011)  
Yilin Wang, Postdoc (PNNL, 2011)  
Vanessa Lebarbier, Postdoc (PNNL, 2010)  
Lyon Zhang, Postdoc (ConocoPhillips, 2010)  
Yuyan Shao, Postdoc (PNNL, 2009)  
Kake Zhu, Postdoc (ECUST, 2008)  
José E. Herrera, Postdoc (Western University, 2007)  
Hyun-Seog Roh, Postdoc (Yonsei University, 2007)  
Alex Platon, Postdoc (ConocoPhillips, 2006)  
Ja Hun Kawk, Postdoc (UNIST, 2005)  
Robert Dagle, MS (PNNL, 2005)  
Robert Rozmiarek, MS (Virent, 2004)  
Saemin Choi, Postdoc (CEO of NX Fuels Inc, 1999)