



Education

- 2021 **Research Fellow in Chemical Engineering**
National University of Singapore
Advisor: Prof. Ning Yan
- 2017-2021 **Ph.D. in Chemical Engineering**
National University of Singapore
Advisor: Prof. Ning Yan
Thesis: Single-Atom Catalysts Supported on Polyoxometalates – Applications, Spectroscopic and Spectrometric Studies
- 2019 Academic exchange Oct-2019-Dec-2019
ETH Zurich
Advisor: Prof. Javier Pérez-Ramírez
- 2015-2017 **M.Sc. in Chemistry**
Heidelberg University
Advisor: Prof. Yuriy Román-Leshkov (*Massachusetts Institute of Technology*)
Thesis: Transition Metal based Catalysts and their use in Lignin Depolymerization and Upgrading
- 2012-2015 **B.Sc. in Biochemistry**
Heidelberg University
Advisor: Prof. Nora Kulak, Chemistry (*Free University of Berlin*)
Thesis: Anthraquinonyl-cyclen complexes and their interaction with DNA

Awards and Honors

- 2021 Schmidt Science Fellow
- 2020 Young Scientist Travel Support Prize (for ICC 2020)
- 2019 ChemCatChem Best Poster Award SACC 2019
- 2018 Best Poster Award AM30
- 2017-2021 SINGA scholarship
- 2015-2016 Germany Scholarship
- 2015 DAAD Rise

Funding Acquisition

- 2020 “Experimental and Theoretical Study on Polyoxometalates Supported Single-Atom Catalysts for Hydrogenation Reaction”, Major Research Project, National Natural Science Foundation China, proposed budget: 800,000 RMB, **Grant approved**
- 2020 “Elucidating the structure, dynamics and performance of single-atom catalysts using mass spectrometry”, Tier-2 proposal, Ministry of Education Singapore, proposed budget: 820,000 SGD, **Declined**

Publications as corresponding author

* denotes (co)-corresponding authorship

2. Zhenhua Zhang, Liyuan Zhang, Siyu Yao, Xiaozhe Song, Weixin Huang, **Max J. Hülsey**,* Ning Yan,* “Support-dependent rate-determining step of CO₂ hydrogenation to formic acid on metal oxide supported Pd catalysts”
J. Catal., **2019**, 376, 57-67.
1. **Max J. Hülsey**,* “Shell Biorefinery: A Comprehensive Introduction”
Green Energy Environ., **2018**, 3 (4), 318-327.

Publications as first author

^ denotes co-first authorship

* denotes (co)-corresponding authorship

8. **Max J. Hülsey**, Geng Sun,^ Bin Zhang,^ Yao Xu, Shipeng Ding, Sie Shing Wong, Ying Zheng, Shinya Furukawa, Hiroyuki Asakura, Yongqiang Cheng, Zili Wu, Rui Si, Ding Ma, Philippe Sautet,* Ning Yan,* “Zero-Valent Pd Atoms Anchored on Polyoxometalate for Low Temperature Hydrodeoxygenation”
ChemRxiv, **2020**, <https://doi.org/10.26434/chemrxiv.13414691.v1>
Manuscript under review, **2021**.
7. Chia Wei Lim, **Max J. Hülsey**,^ Ning Yan,* “Non-Faradaic Promotion of Ethylene Hydrogenation Under Oscillating Potentials”
JACS Au, **2021**, 1, 536-542.
6. **Max J. Hülsey**, Geng Sun, Philippe Sautet, Ning Yan,* “Observing single-atom catalytic sites during reactions with electrospray ionization mass spectrometry”
Angew. Chem. Int. Ed., **2021**, 60, 4764-4773.
5. **Max J. Hülsey**, Chia Wei Lim,^ Sie Shing Wong, Ning Yan,* “Coverage-dependant formic acid oxidation reaction kinetics determined by oscillating potentials”
Mol. Catal., **2021**, 504, 111482.
4. **Max J. Hülsey**, Chia Wei Lim, Ning Yan,* “Promoting heterogeneous catalysis beyond catalyst design”
Chem. Sci., **2020**, 11, 1456-1468.
3. **Max J. Hülsey**, Bin Zhang,^ Zhirui Ma, Hiroyuki Asakura, David N. Do, Wei Chen, Tsunehiro Tanaka, Peng Zhang, Zili Wu, Ning Yan,* “In situ Spectroscopy-Guided Engineering of Rhodium Single-Atom Catalysts for CO Oxidation”
Nat. Commun., **2019**, 10, 1330.
2. **Max J. Hülsey**, Jianguang Zhang, Ning Yan,* “Harnessing the Wisdom in Colloidal Chemistry to make Stable Single-Atom Catalysts”
Adv. Mater., **2018**, 30 (47), 1802304.
1. **Max J. Hülsey**, Huiying Yang, Ning Yan,* “Sustainable routes for the synthesis of renewable heteroatom-containing chemicals”
ACS Sustain. Chem. Eng., **2018**, 6 (5), 5694-5707.

Publications as co-author

^ denotes co-first authorship

* denotes (co)-corresponding authorship

15. Shipeng Ding, **Max J. Hülsey**, Qian He, Hiroyuki Asakura,* Min Gao,* Jun-ya Hasegawa, Tsunehiro Tanaka, Ning Yan,* “Ionic Liquid-Stabilized Single-atom Rh Catalyst against Leaching” *CCS Chem.*, **2021**, In Press.
14. Yaxuan Jing, Yanqing Wang, Shinya Furukawa, Chengyang Sun, **Max J. Hülsey**, Yong Guo, Xiaohui Liu, Ning Yan,* “Towards the circular economy: converting aromatic plastic wastes back to arenes over Ru/Nb₂O₅ catalyst” *Angew. Chem. Int. Ed.*, **2021**, 60, 5527-5535.
13. Fanghua Li, **Max J. Hülsey**, Ning Yan, Yanjun Dai, Chi-Hwa Wang,* “Co-transesterification of waste cooking oil, algal oil and dimethyl carbonate over sustainable nanoparticle catalysts” *Chem. Eng. J.*, **2021**, 405, 127036.
12. Shipeng Ding, Hsi-An Chen, Okorn Mekasuwandumrong, **Max J. Hülsey**, Xinpu Fu, Qian He, Joongjai Panpranot, Chia-Min Yang, Ning Yan,* “High-temperature Flame Spray Pyrolysis Induced Stabilization of Pt Single-Atom Catalysts” *Appl. Catal. B Environ.*, **2021**, 281, 119471.
11. Qiming Sun, Benjamin W. J. Chen, Ning Wang, Qian He, Albert Chang, Chia-Min Yang, Hiroyuki Asakura, Tsunehiro Tanaka, **Max J. Hülsey**, Chi-Hwa Wang, Jihong Yu,* Ning Yan,* “Zeolite-Encaged Pd-Mn Nanocatalysts for CO₂ Hydrogenation and Formic Acid Decomposition” *Angew. Chem. Int. Ed.*, **2020**, 132, 20358-20366.
10. Song Song, Jiafu Qu,^ Peijie Han,^ **Max J. Hülsey**, Guping Zhang, Yunzhu Wang, Shuai Wang, Dongyun Chen,* Jianmei Liu,* Ning Yan,* “Visible-Light-Driven Amino Acids Production from Biomass-based Feedstocks over Ultrathin CdS Nanosheets” *Nat. Commun.*, **2020**, 11, 4899.
9. Shipeng Ding, Yalin Guo,^ **Max J. Hülsey**, Bin Zhang, Hiroyuki Asakura,* Lingmei Liu, Yu Han, Min Gao, Jun-ya Hasegawa,* Botao Qiao,* Tao Zhang, Ning Yan,* “Electrostatic Stabilization of Single-Atom Catalysts by Ionic Liquids” (featured in Chem, Eurekalert, Chinadaily, phys.org, etc.) *Chem*, **2019**, 5, 1-13.
8. Shipeng Ding, **Max J. Hülsey**, Javier Perez-Ramirez,* Ning Yan,* “Transforming energy with single-atom catalysts” *Joule*, **2019**, 3, 1-33.
7. Zhenhua Zhang, Liyuan Zhang, **Max J. Hülsey**, Ning Yan,* “Zirconia phase effect in Pd/ZrO₂ catalyzed CO₂ hydrogenation into formate” *Mol. Catal.*, **2019**, 475, 110461.
6. Ricca Rahman Nasaruddin, Qiaofeng Yao, Tiankai Chen, **Max J. Hülsey**, Ning Yan,* Jianping Xie,* “Hydride-Induced Ligand Dynamic and Structural Transformation of Gold Nanoclusters during Catalytic Reaction” *Nanoscale*, **2018**, 10, 23113-23121.

5. Eric Anderson, Michael L. Stone, **Max J. Hülsey**, Gregg T. Beckham,* Yuriy Román-Leshkov,* “Kinetics of Lignin Solvolysis and Reduction for the Production of Monomers by Flow-through Reductive Catalytic Fractionation”
ACS Sustain. Chem. Eng., **2018**, 6 (6), 7951–7959 (Editor’s choice).
4. Jan Hormann, Jaroslav Malina, Oliver Lemke, **Max J. Hülsey**, Stefanie Wedepohl, Jan Potthoff, Claudia Schmidt, Ingo Ott, Bettina G. Keller, Viktor Brabec, Nora Kulak,* “Multiply intercalator-substituted Cu(II) cyclen complexes as DNA condensers and DNA/RNA synthesis inhibitors”
Inorg. Chem., **2018**, 57 (9), 5004-5012.
3. Weiping Deng, Yunzhu Wang,[^] Sui Zhang, Krishna M. Gupta, **Max J. Hülsey**, Hiroyuki Asakura, Lingmei Liu, Yu Han, Eric M Karp, Gregg T. Beckham, Paul J. Dyson, Jianwen Jiang, Tsunehiro Tanaka, Ye Wang, Ning Yan,* “Catalytic transformation of biomass-derived α -hydroxyl acids into amino acids” (featured in Chem, Chin. J. Catal., The Straits Times, phys.org, etc.)
Proc. Natl. Acad. Sci. U. S. A., **2018**, 115, 5093-5098.
2. Sudipta De, Maria V. Babak, **Max J. Hülsey**, Wee Han Ang,* Ning Yan,* “Designed precursor for the controlled synthesis of highly active atomic and sub-nanometric platinum catalysts on mesoporous silica”
Chem. Asian J., **2018**, 13(8), 1053-1059.
1. Xi Chen, Huiying Yang, **Max J. Hülsey**, Ning Yan,* “One-step Synthesis of N-heterocyclic Compounds from Carbohydrates over Tungsten-based Catalysts”
ACS Sustain. Chem. Eng., **2017**, 5 (11), 11096-11104.

Presentations

20. **Max J. Hülsey**, Victor Fung, Ning Yan “Hydrogen spillover and its relation to catalysis”, **Catalysis Talks**, April 2021
19. **Max J. Hülsey**, Victor Fung, Ning Yan “Hydrogen spillover and its relation to catalysis”, **Just Another Webinar Series (JAWS)**, February 2020
18. **Max J. Hülsey**, Ning Yan “Dynamic promotion of heterogeneous catalysis by oscillating electric potentials”, **Catalysis Talks**, December 2020
17. **Max J. Hülsey**, Ning Yan “Polyoxometalate-Supported Single-Atom Catalysts”, **2020 Virtual AIChE Annual Meeting**, November 2020
16. **Max J. Hülsey**, Geng Sun, Philippe Sautet, Ning Yan “Observing Single-Atom Catalytic Sites during Reactions Using Electrospray Ionization Mass Spectrometry”, **2020 Virtual AIChE Annual Meeting**, November 2020
15. **Max J. Hülsey**, Bin Zhang, Shipeng Ding, Hiroyuki Asakura, Zili Wu, Philippe Sautet, Ning Yan “Low-Temperature Hydrodeoxygenation By Polyoxometalate-Supported Pd₁ Single-Atom Catalysts”, **2020 Virtual AIChE Annual Meeting**, November 2020
14. **Max J. Hülsey**, Sambath Baskaran, Jun Li, Ning Yan “Establishing Non-Linear Scaling Relations for Single-Atom Catalysts”, **The 3rd International Symposium on Single-Atom Catalysis** (cancelled due to COVID-19), Pacific Grove, United States of America, June 2020
13. **Max J. Hülsey**, Geng Sun, Zili Wu, Philippe Sautet, Ning Yan “Low-temperature hydrodeoxygenation using polyoxometalate-supported Pd₁ single-atom catalysts”, **17th International Congress on Catalysis 2020 Vision** (cancelled due to COVID-19), San Diego, United States of America, June 2020 (supported by the Young Scientist Travel Support Prize)

12. **Max J. Hülsey**, Bin Zhang, Hiroyuki Asakura, Tsunehiro Tanaka, Ning Yan “In situ Spectroscopy-Guided Engineering of Rhodium Single-Atom Catalysts for CO Oxidation”, **The 8th Asia Pacific Congress on Catalysis**, Bangkok, Thailand, August 2019
11. **Max J. Hülsey**, Bin Zhang, Ning Yan “In situ Spectroscopy-Guided Engineering of Rhodium Single-Atom Catalysts for CO Oxidation”, **Southeast Asia Catalysis Conference 2019**, Singapore, May 2019 (ChemCatChem Best Poster Award)
10. **Max J. Hülsey**, Bin Zhang, Hiroyuki Asakura, Tsunehiro Tanaka, Ning Yan “Heteropoly Acid-Supported Single-Atom Catalysts”, **AM30 Symposium Singapore – Advanced Emerging Soft Materials**, Singapore, December 2018
9. **Max J. Hülsey**, Weiping Deng, Yunzhu Wang, Ning Yan, “Catalytic Amino Acid Production from Biomass”, **2018 AIChE Meeting**, United States of America, November 2018
8. **Max J. Hülsey**, Bin Zhang, Ning Yan, “Correlation between Atom-Support Interaction and Catalyst Stability & Activity: Implications from a Series of Heteropoly Acids Based Pt1 Catalysts”, **2018 AIChE Meeting**, Pittsburgh, United States of America, November 2018
7. **Max J. Hülsey**, Bin Zhang, Ning Yan, “In-Situ Spectroscopic Evidence for the Mars-Van Krevelen Mechanism in the Rh Single-Atom Catalyzed CO Oxidation”, **2018 AIChE Meeting**, Pittsburgh, United States of America, November 2018
6. **Max J. Hülsey**, Bin Zhang, Ning Yan, “Platinum single atoms supported on heteropoly acids – structure, Stability and Reactivity”, **2018 International Symposium on Advancement and Prospect of Catalysis Science & Technology**, Sydney, Australia, July 2018
5. **Max J. Hülsey**, Bin Zhang, Hiroyuki Asakura, Tsunehiro Tanaka, Peng Zhang, Ning Yan, “In-situ Spectroscopic Evidence for the Mars-van Krevelen Mechanism in the Rh Single-Atom Catalyzed CO Oxidation”, **International Symposium on Relations between Homogeneous and Heterogeneous Catalysis**, Sydney, Australia, July 2018
4. **Max J. Hülsey**, Bin Zhang, Ning Yan, “In-situ Spectroscopic Evidence for the Mars-van Krevelen Mechanism in the Rh Single-Atom Catalyzed CO Oxidation”, **The 2nd International Symposium on Single-Atom Catalysis**, Beijing, China, June 2018
3. **Max J. Hülsey**, Bin Zhang, Ning Yan, “In-situ Spectroscopic Evidence for the Mars-van Krevelen Mechanism in the Rh Single-Atom Catalyzed CO Oxidation”, **9th Singapore Catalysis Society Forum**, Singapore, May 2018
2. Bin Zhang, **Max J. Hülsey**, Hiroyuki Asakura, Ning Yan, “Atomically dispersed rhodium on Self-assembled phosphotungstic acid: structural features and catalytic CO oxidation properties”, **2017 AIChE meeting**, Minneapolis, United States of America, October-November 2017
1. Jan Hormann, **Max J. Hülsey**, Nora Kulak, “Copper complexes of novel anthraquinone-substituted cyclen derivatives for DNA binding”, **13th International Symposium on Applied Bioinorganic Chemistry**, Galway, Ireland, June 2015

Teaching Experience

2020-present Involved in the conception and design of the new module Advanced topics in Catalysis
National University of Singapore

2017-present **Graduate Teaching Assistant**
National University of Singapore
Chemical Engineering Laboratory I & II, CN 2108 & 3108
Chemical Kinetics and Reactor Design, CN 2116
Chemical Engineering Thermodynamics, CN 2121
Chemical Engineering Principles and Practice II, CN2102

2014-2016 **Student instructor**
Heidelberg University
General and Inorganic Chemistry I
Inorganic Chemistry III
Physical Chemistry I

Academic Service

2019-present Lead of the NUS ChBE literature club
2018-present Independent reviewer for Angew. Chem. Int. Ed., ACS Sustain. Chem. Eng., AIChE J., Green Energy Environ., Biomass Convers. Biorefin., Mol. Catal., & RSC Adv.
2012-2015 Course speaker, member of the study commission
2012-2013 Member of the examination commission

Professional memberships

2018-present American Institute of Chemical Engineers
2017-present American Chemical Society