

– MAX J. HÜLSEY –

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Education

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

Awards and Honors

2021	Schmidt Science Fellowship Finalist
2020	Young Scientist Travel Support Prize (for ICC 2020)
2019	ChemCatChem Best Poster Award SACC 2019
2018	Best Poster Award AM30
2017-present	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
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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, **Status pending**

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”
ChemRxiv, **2020**, <https://doi.org/10.26434/chemrxiv.13176995.v1>.
JACS Au, **2021**, Accepted Article.
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”
ChemRxiv, **2020**, <https://doi.org/10.26434/chemrxiv.13077485.v1>.
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"
Angew. Chem. Int. Ed., **2020**, Under Revision.
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

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

<i>2020-present</i>	Involved in the conception and design of the new module Advanced topics in Catalysis <i>National University of Singapore</i>
<i>2017-present</i>	Graduate Teaching Assistant <i>National University of Singapore</i> 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
<i>2014-2016</i>	Student instructor <i>Heidelberg University</i> General and Inorganic Chemistry I Inorganic Chemistry III Physical Chemistry I

Academic Service

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

Professional memberships

<i>2017-present</i>	American Chemical Society
<i>2018-present</i>	American Institute of Chemical Engineers