

Marcel Schreier

Massachusetts Institute of Technology, Department of Chemistry
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Education

- Postdoctoral Fellow** *Massachusetts Institute of Technology (MIT)*
Advisor: Prof. Yogesh Surendranath May 2017 - present
Research: Surface chemistry during electrocatalytic CO reduction
- Ph.D. in Chemistry** *Ecole Polytechnique Federale de Lausanne (EPFL)*
Advisor: Prof. Michael Grätzel May 2017
Research: Devices and catalysts for solar-driven electrochemical reduction of CO₂
- M.S. in Chemical and Bioengineering** *Swiss Federal Institute of Technology (ETH Zurich)*
Semester Project: Prof. Petr Novak October 2012
- Master Thesis** *California Institute of Technology (Caltech)*
Advisor: Prof. Sossina Haile September 2011 – May 2012
Research: High performance solid acid fuel cell electrodes
- B.S. in Chemistry and Chemical Engineering** *Ecole Polytechnique Federale de Lausanne (EPFL)*
Best GPA Class of 2009 August 2009

Honors and Fellowships

- Co-Chair Gordon Research Seminar – Electrochemistry 2020
SNSF Early Postdoc.Mobility Fellowship 2017
IPMI Student Award 2015
BASF Talent Pool 2010
Rotary Embassadorial Scholarship (declined) 2010
Pelet Prize, EPFL 2009

Industrial / Research Experience

- University of Alberta**, Internship Mechanism of olefin oligomerization in Fischer-Tropsch refining
Advisor: Eric Rivard, Arno de Klerk April – June 2010
- ETH Zurich**, Research Assistant Extraction of magnetic nanoparticles on the ton/hour scale
Advisor: Wendelin Stark October 2009 – March 2010
- BASF**, Internship Study of electrolyte stability in lithium ion batteries
Advisor: Klaus Leitner July – September 2009
- Siegfried AG**, Internship Batch plant heating/cooling system engineering
August – September 2008

Scientific Publications

Publications: 23, Cumulative Citations: 2713, H-Index: 20

- (23) **Marcel Schreier**, Youngmin Yoon, Megan N. Jackson, Yogesh Surendranath; **Angew. Chemie, Int. Ed.** 2018, 57 (32), 10221-10225
Competition between H and CO for active sites governs Cu mediated electrosynthesis of hydrocarbon fuels
- (22) **Marcel Schreier**, Florent Heroguel, Ludmilla Steier, Jeremy Luterbacher, Matthew T. Mayer, Jingshan Luo, Michael Grätzel; **Nature Energy**, 2017, 2, 17087
Solar conversion of CO₂ to CO using earth-abundant electrocatalysts prepared by atomic layer modification of CuO
- (21) Hansel Comas Rojas, Sebastiano Bellani, Eduardo Aluicio Sarduy, Francesco Fumagalli, Matthew T Mayer, **Marcel Schreier**, Michael Grätzel, Fabio Di Fonzo, Maria Rosa Antognazza; **ACS Omega**, 2017, 7, 3424 – 2431
All Solution-Processed, Hybrid Organic–Inorganic Photocathode for Hydrogen Evolution
- (20) Min-Kyu Son, Ludmilla Steier, **Marcel Schreier**, Matthew T Mayer, Jingshan Luo, Michael Grätzel; **Energy Environ. Sci.**, 2017, 10, 912–918
A copper nickel mixed oxide hole selective layer for Au-free transparent cuprous oxide photocathodes
- (19) Xiaoyu Zhang[‡], Yaoyao Xu[‡], Fabrizio Giordano*, **Marcel Schreier***, Norman Pellet, Yue Hu, Chenyi Yi, Neil Robertson, Jianli Hua*, Shaik M. Zakeeruddin*, He Tian, Michael Grätzel*; **J. Am. Chem. Soc.**, 2016, 138 (34), 10742–10745 * **corresponding author**
Molecular Engineering of Potent Sensitizers for Very Efficient Light Harvesting in Thin-Film Solid-State Dye-Sensitized Solar Cells
- (18) João Azevedo, S David Tilley, **Marcel Schreier**, Morgan Stefik, Célia Sousa, João Pedro Araújo, Adélio Mendes, Michael Grätzel, Matthew T Mayer; **Nano Energy**, 2016, 24, 10–16
Tin oxide as stable protective layer for composite cuprous oxide water-splitting photocathodes
- (17) Genevieve P. S. Lau[‡], **Marcel Schreier[‡]**, Dmitry Vasilyev, Rosario Scopelliti, Michael Grätzel, Paul J. Dyson; **J. Am. Chem. Soc.**, 2016, 138 (25), 7820–7823 [‡] **equal contribution**
New Insights Into the Role of Imidazolium-based Promoters for the Electroreduction of CO₂ on a Silver Electrode
- (16) Jingshan Luo, Ludmilla Steier, Min-Kyu Son, **Marcel Schreier**, Matthew T Mayer, Michael Grätzel; **Nano Lett.**, 2016, 16 (3), 1848–1857
Cu₂O nanowire photocathodes for efficient and durable solar water splitting
- (15) **Marcel Schreier**, Jingshan Luo, Peng Gao, Thomas Moehl, Matthew T. Mayer, and Michael Grätzel; **J. Am. Chem. Soc.**, 2016, 138 (6), 1938–1946
Covalent Immobilization of a Molecular Catalyst on Cu₂O Photocathodes for CO₂ Reduction
- (14) Hansel Comas Rojas, Sebastiano Bellani, Francesco Fumagalli, Gabriele Tullii, Silvia Leonardi, Matthew T Mayer, **Marcel Schreier**, Michael Grätzel, Guglielmo Lanzani, Fabio Di Fonzo, Maria Rosa Antognazzadoi; **Energy Environ. Sci.**, 2016, 12, 3710–3723
Polymer-based photocathodes with a solution-processable cuprous iodide anode layer and a polyethyleneimine protective coating
- (13) Francesco Fumagalli, Sebastiano Bellani, **Marcel Schreier**, Silvia Leonardi, Hansel Comas Rojas, Ali Ghadirzadeh, Gabriele Tullii, Alberto Savoini, Gianluigi Marra, Laura Meda, Michael Grätzel, Guglielmo Lanzani, Matthew T Mayer, Maria Rosa Antognazza, Fabio Di Fonzo; **J. Mater. Chem. A**, 2016, 4, 2178–2187
Hybrid organic-inorganic H₂-evolving photocathodes: understanding the route toward high performances organic photoelectrochemical water splitting

- (12) Paula Dias, **Marcel Schreier**, S David Tilley, Jingshan Luo, João Azevedo, Luísa Andrade, Dongqin Bi, Anders Hagfeldt, Adélio Mendes, Michael Grätzel, Matthew T Mayer; **Adv. Energy Mater.**, 2015, 5, 1501537
Transparent Cuprous Oxide Photocathode Enabling a Stacked Tandem Cell for Unbiased Water Splitting
- (11) Jingshan Luo, Zhen Li, Shiro Nishiwaki, **Marcel Schreier**, Matthew T Mayer, Peter Cendula, Yong Hui Lee, Kunwu Fu, Anyuan Cao, Mohammad Khaja Nazeeruddin, Yaroslav E Romanyuk, Stephan Buecheler, S David Tilley, Lydia Helena Wong, Ayodhya N Tiwari, Michael Grätzel; **Adv. Energy Mater.**, 2015, 5: 1501520
Targeting Ideal Dual-Absorber Tandem Water Splitting Using Perovskite Photovoltaics and $\text{CuIn}_x\text{Ga}_{1-x}\text{Se}_2$ Photocathodes
- (10) Ludmilla Steier, Jingshan Luo, **Marcel Schreier**, Matthew T Mayer, Timo Sajavaara, Michael Grätzel; **ACS Nano**, 2015, 9 (12), 11775–11783
Low-Temperature Atomic Layer Deposition of Crystalline and Photoactive Ultrathin Hematite Films for Solar Water Splitting
- (9) **Marcel Schreier**, Laura Curvat, Fabrizio Giordano, Ludmilla Steier, Antonio Abate, Shaik M Zakeeruddin, Jingshan Luo, Matthew T Mayer, Michael Grätzel; **Nature Communications**, 2015, 6, 7326
Efficient photosynthesis of carbon monoxide from CO_2 using perovskite photovoltaics
- (8) Jingshan Luo, S David Tilley, Ludmilla Steier, **Marcel Schreier**, Matthew T Mayer, Hong Jin Fan, Michael Grätzel; **Nano Lett.**, 2015, 15 (2), 1395–1402
Solution Transformation of Cu_2O into CuInS_2 for Solar Water Splitting
- (7) **Marcel Schreier**, Peng Gao, Matthew T Mayer, Jingshan Luo, Thomas Moehl, Mohammad K Nazeeruddin, S David Tilley, Michael Grätzel; **Energy Environ. Sci.**, 2015, 8, 855–861
Efficient and selective carbon dioxide reduction on low cost protected Cu_2O photocathodes using a molecular catalyst
- (6) Yelin Hu, Aswani Yella, Stefan Guldin, **Marcel Schreier**, Francesco Stellacci, Michael Grätzel, Morgan Stefik; **Adv. Energy Mater.**, 2014, 4, 1400510
High-Surface-Area Porous Platinum Electrodes for Enhanced Charge Transfer
- (5) Jingshan Luo, Jeong-Hyeok Im, Matthew T Mayer, **Marcel Schreier**, Mohammad Khaja Nazeeruddin, Nam-Gyu Park, S David Tilley, Hong Jin Fan, Michael Grätzel, **Science**, 2014, 6204 (345), 1593–1596
Water photolysis at 12.3% efficiency via perovskite photovoltaics and Earth-abundant catalysts
- (4) S David Tilley, **Marcel Schreier**, João Azevedo, Morgan Stefik, Michael Graetzel; **Adv. Funct. Mater.**, 2014, 24, 303–311
Ruthenium Oxide Hydrogen Evolution Catalysis on Composite Cuprous Oxide Water-Splitting Photocathodes
- (3) Áron Varga, Moritz Pfohl, Nicholas A Brunelli, **Marcel Schreier**, Konstantinos P Giapis, Sossina M Haile; **Phys. Chem. Chem. Phys.**, 2013, 15, 15470–15476
Carbon nanotubes as electronic interconnects in solid acid fuel cell electrodes
- (2) Michael Rossier, **Marcel Schreier**, Urs Krebs, Beat Aeschlimann, Roland Fuhrer, Martin Zeltner, Robert N Grass, Detlef Günther, Wendelin J Stark; **Sep. Purif. Technol.**, 2012, 96, 68–74
Scaling up magnetic filtration and extraction to the ton per hour scale using carbon coated metal nanoparticles
- (1) Lorenz Gubler, **Marcel Schreier**, Petr Novák; **PSI ECL Jahresbericht**, 2011, 43, doi:10.3929/ethz-a-007047464
Lithium-ion conductivity of radiation grafted membranes

Patents / Applications

- (3) Yogesh Surendranath, Bing Yan, **Marcel Schreier**
Driving Heterogeneous Catalysis via Electrochemical Proton Pumping in Proton-Electron Conducting Films
U.S. Provisional Application No.: 62/717,381 (2018)
- (2) Michael Grätzel, **Marcel Schreier**
Method for producing a photoelectrocatalysis system for the photoelectrochemical utilization of carbon dioxide
DE 102015219131.1, PCT/EP2016/072915 (2016)
- (1) Michael Grätzel, Christian Reller, Günter Schmid, **Marcel Schreier**
Reduction Method And Electrolysis System For Electrochemical Carbon Dioxide Utilization
DE 102015202258.7, EU 16704413.0, CN 201680009432.6, JP 2017-541254, US 15/549,778, SA 2017/05252 (2015)

Selected Conference Presentations / Invited Talks

- (18) ACS National Fall Meeting, 2019 (Invited, to come)
- (17) Stanford University, March 2019 (Invited)
- (16) University of California, Riverside, March 2019 (Invited)
- (15) University of British Columbia, February 2019 (Invited)
- (14) ETH Zurich, February 2019 (Invited)
- (13) University of Minnesota, Twin Cities, February 2019 (Invited)
- (12) University of California, Berkeley, February 2019 (Invited)
- (11) University of Wisconsin, Madison, February 2019 (Invited)
- (10) Purdue University, February 2019 (Invited)
- (9) Princeton University, January 2019 (Invited)
- (8) 69th Annual Meeting of the International Society of Electrochemistry, Bologna, Italy, September 2018
Talk: "Achieving selective CO reduction by understanding the role of proton transfer"
- (7) 256th ACS National Meeting & Exposition, Boston, MA, USA, August 2018
Talk: "Achieving selective CO reduction by understanding the role of proton transfer"
- (6) Lawrence Berkeley National Laboratory, JCAP, Berkeley, CA, USA, June 2018
Invited Talk: "Molecular and heterogeneous catalysis for the sunlight-driven reduction of CO₂ to fuels"
- (5) Gordon Research Seminar: Electrochemistry, Ventura, CA, USA, January 2018
Talk: "Achieving selective CO reduction by understanding the role of proton transfer"
- (4) Siemens AG Research Center, Munich, Germany, December 2016
Invited Talk: "Molecular and Heterogeneous Catalysis for the Sunlight-Driven Reduction of CO₂ to Fuels"
- (3) Materials Research Society (MRS) Fall Meeting 2016, Boston, MA, USA, November 2016
Talk: "Molecular and Heterogeneous Catalysis for the Sunlight-Driven Reduction of CO₂ to Fuels"
- (2) 66th Annual Meeting of the International Society of Electrochemistry, Taipei, Taiwan, October 2015
Talk: "Efficient sunlight-driven reduction of CO₂ to fuels based on Cu₂O and perovskite absorbers"
- (1) IPMI 39th Annual Conference, San Antonio, TX, USA, June 2015
Invited Talk: "Storage of solar energy in carbon-based fuels"

Teaching Experience

Redox Chemistry Laboratory Class Teaching Assistant Instructor: Anne-Sophie Chauvin	Ecole Polytechnique Federale de Lausanne (EPFL) Fall 2014, Spring 2015
Electrochemical Engineering Teaching Assistant Instructor: Christos Comninellis	Ecole Polytechnique Federale de Lausanne (EPFL) Spring 2013, Spring 2014
Transport Phenomena Teaching Assistant Instructor: Christos Comninellis	Ecole Polytechnique Federale de Lausanne (EPFL) Fall 2013
Chemical Structure Analysis Teaching Assistant Instructors: Pierre Vogel, Luc Pattiny	Ecole Polytechnique Federale de Lausanne (EPFL) Fall 2008

Mentoring

Research Mentor Mentoring of two undergraduate and one master student Synthesis and performance characterization of CO ₂ reduction catalysts	Ecole Polytechnique Federale de Lausanne (EPFL) 2014 – 2016
Research Mentor Mentoring of a 1 st year graduate student Electrolyte engineering for steering selectivity of hydrocarbon electrosynthesis	Massachusetts Institute of Technology (MIT) 2018
Research Mentor Mentoring of a visiting summer student from China Kinetic influence of electrolyte cations on CO reduction catalysis	Massachusetts Institute of Technology (MIT) Summer 2018

Professional Activities and Affiliations

Peer Reviewer	<i>Chemical Science, Catalysis Science & Technology, Energy & Env. Science Scientific Reports, ACS Sustainable Energy & Engineering, Electrochimica Acta Journal of Electroanalytical Chemistry, Electrochemistry Communications Optik, Materials Chemistry and Physics, Nano Energy International Journal of Hydrogen Energy</i>
Affiliations	<i>American Chemical Society American Institute of Chemical Engineers International Society of Electrochemistry International Precious Metals Institute</i>
Service	Elected Member of the Steering Committee of the Faculty of Basic Science at EPFL (2015 – 17)

Media Experience

- (3) Interview about the economic viability of CO₂ reduction to fuels. Magazine *Bilan*, Switzerland
August, 2018
- (2) Radio interview on postdoctoral research WMBR Radio, USA
August 2017
- (1) Interview on flammability of lithium ion batteries Newspaper *Le Matin*, Switzerland
April 2014

Languages

English	fluent
German	fluent
French	fluent
Mandarin	studying