

# MATHIEU S. PRÉVOT

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## Higher Education & Professional Experience

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- Postdoctoral Fellow – University of California, Berkeley, USA** **Oct 2017 - current**  
*Swiss National Science Foundation Fellowship*
- PhD studies – École Polytechnique Fédérale de Lausanne, Switzerland** **Oct 2012 – Jun 2017**  
*Faculty of Basic Sciences – Dpt. of Chemistry & Chemical Engineering*  
PhD diploma in Chemistry & Chemical Engineering
- Master studies – École Normale Supérieure de Lyon, France** **Sept 2009 – Aug 2012**  
Master degree in “Science of Matter” – option Chemistry  
*Obtained with distinction (Très Bien)*
- Bachelor studies – École Normale Supérieure de Lyon, France** **Sept 2008 – Aug 2009**  
Bachelor degree in “Science of Matter” – option Chemistry  
*Obtained with distinction (Bien)*

## Research Experience

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- Postdoctoral project under the supervision of Prof. Omar Yaghi** **Oct 2017 - current**  
*University of California, Berkeley, USA*
- Topic:* Designing and investigating Covalent Organic Frameworks and Metal-organic Frameworks for CO<sub>2</sub> reduction.
- PhD project under the supervision of Prof. Kevin Sivula** **Oct 2012 – Jun 2017**  
*École Polytechnique Fédérale de Lausanne, Switzerland*
- Thesis:* Investigating and controlling charge carrier behavior in delafos-site p-type CuFeO<sub>2</sub> photocathodes for solar fuel production.
- Master project under the supervision of Prof. Curtis Berlinguette** **Jan 2012 – Jul 2012**  
*University of Calgary, Canada*
- Thesis:* Development of mixed metal oxide thin films created by photo-chemical metal-organic decomposition as catalysts for the water oxidation reaction.

**Research Internship under the supervision of Prof. Curtis Berlinguette**  
*University of Calgary, Canada*

**Apr 2011 – Jun 2011**

*Topic:* Investigation of iron oxide thin films created by photochemical metal-organic decomposition as catalysts for the water oxidation reaction.

**Research Internship under the supervision of Prof. Chantal Andraud**  
*École Normale Supérieure de Lyon, France*

**Jun 2010**

*Topic:* Synthesis of organic push-pull structures applied to non-linear optical microscopy.

## **Young Researcher Supervision**

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**Yang Li (Exchange PhD student, Tianjin University)**

**1 year**

*Development of transparent semiconducting underlayer for CuFeO<sub>2</sub> photocathodes*

**Pierre Bouvier (Master Student)**

**4 months**

**Julian Koch (Master Student)**

**4 months**

*Development of WSe<sub>2</sub>/WO<sub>3</sub> Janus nanoparticles for photocatalytic water splitting*

**Xavier Pereira Dacosta (Master Student)**

**4 months**

*Optimization of CuFeO<sub>2</sub> photocathodes for solar CO<sub>2</sub> reduction*

## **Teaching Experience**

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**Introduction to chemical engineering – Lab course (Teaching Assistant)**

**2 semesters**

*2<sup>nd</sup> year Bachelor – Chemistry Students*

**Chemical Engineering: Transport phenomena (Teaching Assistant)**

**6 semesters**

*3<sup>rd</sup> year Bachelor – Chemical Engineering Students*

**1<sup>st</sup> year Chemistry**

**1 semester**

*1<sup>st</sup> year Bachelor – Med School Students*

**Interdisciplinary project (Supervision of the experimental work)**

**8 weeks**

*Synthesis of supported nanoparticle catalysts for biomass conversion*

*1<sup>st</sup> year Master – Chemistry Students*

## Peer-reviewed Scientific Publications

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### ▪ Selected publications

1. [Evaluating charge carrier transport and surface states in CuFeO<sub>2</sub> photocathodes.](#)  
M.S. Prévot, X.A. Jeanbourquin, W.S. Bourée, F. Abdi, D. Friedrich, R. van de Krol, N. Guijarro, F. Le Formal, K. Sivula, *Chem. Mater.*, 2017, **29**, 4952
2. [Improving charge collection with delafossite photocathodes: a host-guest CuAlO<sub>2</sub>/CuFeO<sub>2</sub> approach.](#)  
M.S. Prévot, Y. Li, N. Guijarro, K. Sivula, *J. Mater. Chem. A*, 2016, **4**, 3018
3. [Self-assembled 2D WSe<sub>2</sub> thin films for photoelectrochemical hydrogen production.](#)  
X. Yu\*, M.S. Prévot\*, N. Guijarro, K. Sivula, *Nature Commun.*, 2015, **6**, 7596  
\*These authors contributed equally to this work
4. [Enhancing the performance of a robust sol-gel-processed p-type delafossite CuFeO<sub>2</sub> photocathode for solar water reduction.](#)  
M.S. Prévot, N. Guijarro, K. Sivula, *ChemSusChem*, 2015, **8**, 1359
5. [Photoelectrochemical tandem cells for solar water splitting.](#)  
M.S. Prévot, K. Sivula, *J. Phys. Chem. C*, 2013, **117**, 17879
6. [Water oxidation catalysis: electrocatalytic response to metal stoichiometry in amorphous metal oxide films containing Iron, Cobalt, and Nickel.](#)  
R.D.L. Smith, M.S. Prévot, R.D. Fagan, S. Trudel, C.P. Berlinguette, *J. Am. Chem. Soc.*, 2013, **135**, 11580
7. [Photochemical route for accessing amorphous metal oxide materials for water oxidation catalysis.](#)  
R.D.L. Smith, M.S. Prévot, R.D. Fagan, Z. Zhang, P.A. Sedach, M.K.J. Siu, S. Trudel, C.P. Berlinguette, *Science*, 2013, **340**, 60

### ▪ Other publications

1. [CuInGaS<sub>2</sub> photocathodes treated with SbX<sub>3</sub> \(X=Cl, I\): the effect of the halide on solar water splitting performance. \(Invited paper\)](#)  
N. Guijarro, M.S. Prévot, M. Johnson, X. Yu, W.S. Bourée, X.A. Jeanbourquin, P. Borno, F. Le Formal, K. Sivula, *J. Phys. D: Appl. Phys.*, 2017, **50**, 044003
2. [Robust hierarchically structured biphasic ambipolar oxide photo-electrode for light-driven chemical regulation and switchable logic applications.](#)  
W.S. Bourée, M.S. Prévot, X.A. Jeanbourquin, N. Guijarro, M. Johnson, F. Le Formal, K. Sivula, *Advanced Materials*, 2016, **28**, 9308

3. [A Gibeon meteorite yields a high-performance water oxidation electrocatalyst.](#) (*Nature* highlight)  
F. Le Formal, N. Guijarro, W.S. Bourée, A. Gopakumar, M.S. Prévot, A. Daubry, L. Lombardo, C. Sornay, J. Voit, A. Magrez, P.J. Dyson, K. Sivula, *Energy Environ. Sci.*, 2016, **9**, 3448
4. [A bottom-up approach towards all-solution-processed high-efficiency Cu\(In,Ga\)S<sub>2</sub> photocathodes for water splitting.](#)  
N. Guijarro, M.S. Prévot, X. Yu, X.A. Jeanbourquin, P. Borno, W.S. Bourée, M. Johnson, F. Le Formal, K. Sivula, *Adv. Energy Materials*, 2016, **6**, 1501949
5. [Challenges towards economic fuel generation from renewable electricity: the need for efficient electrocatalysts.](#)  
F. Le Formal, W.S. Bourée, M.S. Prévot, K. Sivula, *CHIMIA*, 2015, **69**, 789
6. [Direct light-driven water oxidation by a ladder-type conjugated polymer photoanode.](#)  
P. Borno, M.S. Prévot, X. Yu, N. Guijarro, K. Sivula, *J. Am. Chem. Soc.*, 2015, **137**, 15338
7. [Autodecomposition approach for the low-temperature mesostructuring of nanocrystal semiconductor electrodes.](#)  
N. Guijarro, M.S. Prévot, X.A. Jeanbourquin, X. Yu, K. Sivula, *Chem. Mater.*, 2015, **27**, 6337
8. [Templating sol-gel hematite films with sacrificial copper oxide: enhancing photoanode performance with nanostructure and oxygen vacancies.](#)  
Y. Li, N. Guijarro, X. Zhang, M.S. Prévot, X.A. Jeanbourquin, K. Sivula, H. Chen, Y. Li, *ACS Appl. Mater. Interfaces*, 2015, **7**, 16999
9. [Surface modification of semiconductor photoelectrodes.](#)  
N. Guijarro, M.S. Prévot, K. Sivula, *Phys. Chem. Chem. Phys.*, 2015, **17**, 15655
10. [Enhancing the charge separation in nanocrystalline Cu<sub>2</sub>ZnSnS<sub>4</sub> photocathodes for photoelectrochemical application: the role of surface modification.](#)  
N. Guijarro, M.S. Prévot, K. Sivula, *J. Phys. Chem. Lett.*, 2014, **5**, 3902
11. [Multiflake thin film electronic devices of solution-processed 2D MoS<sub>2</sub> enabled by sonopolymer-assisted exfoliation and surface modification.](#)  
X. Yu, M.S. Prévot, K. Sivula, *Chem. Mater.*, 2014, **26**, 5892

## Presentations at International Conferences

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1. Evaluating charge carrier transport and surface states in CuFeO<sub>2</sub> photocathodes (Oral presentation)  
International Solar Fuel Conference 2, UC San Diego, USA, July 5<sup>th</sup> – July 10<sup>th</sup>, 2017
2. Earth-abundant solution-processed CuFeO<sub>2</sub> photocathode for water reduction (Poster)  
[Gordon Research Conference – Solar Fuels](#). Luca, Italy. Feb 27<sup>th</sup> – Mar 3<sup>rd</sup>, 2016

3. Earth-abundant solution-processed photocathodes for water reduction (Oral presentation)  
European Material Research Society – Fall Meeting. Warsaw, Poland. Sep 15<sup>th</sup> – Sep 18<sup>th</sup>, 2015
4. Identifying limitations and enhancing photocurrent in solution-processed p-type CuFeO<sub>2</sub> photocathodes (Oral presentation)  
Material Research Society – Fall Meeting. Boston, MA, USA. Nov 30<sup>th</sup> – Dec 5<sup>th</sup>, 2014
5. Identifying limitations and enhancing photocurrent in solution-processed p-type CuFeO<sub>2</sub> photocathodes for solar hydrogen production (Oral presentation)  
European Material Research Society – Spring Meeting. Lille, France. May 26<sup>th</sup> – May 30<sup>th</sup>, 2014