

# Dr. Matthias M. May

## Curriculum Vitae

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Address: Universität Ulm  
Institute of Theoretical Chemistry  
Germany  
Email: Matthias.May@uni-ulm.de  
ORCID: orcid.org/0000-0002-1252-806X  
WWW: www.uni-ulm.de/specsy



### Personal details

**Born** 22.02.1984

**Citizenship** German

### Short profile

- **Education:** Diploma (Physics, HU Berlin), overall grade 1.1 (*very good*); PhD (Physics, HU Berlin) with distinction (*summa cum laude*).
- **Publications:** 26 peer-reviewed, 2 book chapters, 2 granted patents.
- Online information: ResearcherID/Publons: H-8552-2013.

### Professional Experience

since 12/2020	Associate member	Cluster of Excellence on batteries, <b>Post Lithium Storage</b> .
since 03/2020	Group leader	<b>Universität Ulm</b> , Institute of Theoretical Chemistry, Germany.
2018 – 2020	Postdoc	<b>Helmholtz-Zentrum Berlin</b> , Institute for Solar Fuels, Germany.
04/2018 – 10/2018	Lecturer (physics)	<b>Universität Heidelberg</b> , International Study Centre, Germany.
2016 – 2018	Postdoctoral Fellow	<b>University of Cambridge</b> , Department of Chemistry, United Kingdom.
2014 – 2015	Postdoc	<b>Technische Universität Ilmenau</b> , Fachgebiet Photovoltaik, Germany.
2011 – 2014	Doctoral research	<b>Helmholtz-Zentrum Berlin</b> , Institute for Solar Fuels.

### Third-party funding & awards

10/2021	“Curious Minds Award” from Merck and Manager-Magazin.
09/2021	BMBF-project “NETPEC” on negative emissions by photoelectrochemical methods. Consortium coordinator. 10/2021 – 09/2024.
03/2021	BMBF-project “H2Demo” on prototypes for solar water splitting. 03/2021 – 02/2026.
01/2021	Board’s Reserve project of the DFG-funded Cluster of Excellence Post Lithium Storage on electrochemical interfaces in magnesium-based batteries. 04/2021 – 03/2024.
12/2019	Emmy Noether young investigator group by Deutsche Forschungsgemeinschaft. 03/2020 – 03/2025.
11/2018	“Experiment!” grant of the VolkswagenStiftung. 05/2019 – 10/2020.
11/2017	“Gold medal” for the invention “Photoelektrochemische Zelle zur lichtinduzierten Wasserspaltung”, International Trade Fair iENA in Nürnberg, Germany.
01/2016 – 01/2018	Postdoctoral fellowship at the University of Cambridge (U.K.) by the German National Academy of Sciences Leopoldina.
11/2015	Helmholtz PhD award of the Helmholtz Association’s energy division.
05/2014	Best poster award at the 562. WE-Heraeus seminar “From Sunlight to Fuels” in Bad Honnef, Germany.
10/2011 – 05/2014	PhD scholarship by Studienstiftung des deutschen Volkes.

## Teaching

2021 – ongoing	Supervision of two B.Sc. and three PhD theses. Universität Ulm.
04/2018 – 10/2018	Teaching Physics (undergraduate courses). Internationales Studienzentrum, Universität Heidelberg.
09/2016 – 02/2018	Supervision of students for the Course “Theoretical Techniques” (Chemistry). Trinity College & Pembroke College, University of Cambridge.
2011 – 2015	Co-supervision of one B.Sc. and two M.Sc. theses. Helmholtz-Zentrum Berlin and Humboldt-Universität zu Berlin.
2009 – 2010	Co-supervision of the advanced student lab “Angle-resolved photoelectron spectroscopy with synchrotron radiation”. Co-supervision of one B.Sc. and one M.Ed. thesis. Humboldt-Universität zu Berlin.
10/2004 – 02/2005	Course “Unix for first-semester”. Universität Stuttgart.

## Research

- **Focus:** My research focuses on the electronic structure of semiconductor surfaces designated for (photo)electrochemical energy conversion and their interface to the electrolyte. I study these surfaces and interfaces by both computational and experimental methods to gain an atomistic understanding and ultimately control their properties.
- **Community engagement:** I have acted as a referee for grants and journals, including *ACS Applied Materials & Interfaces*, *Journal of Physical Chemistry C*, *RSC Advances*, *Physical Chemistry Chemical Physics*, *Nano Letters*, *Materials Research Express*, *APL Materials*, *Sustainable Energy & Fuels*, *Joule* as well as *Journal of the American Chemical Society*. Furthermore, I chaired sessions at the German Physical Society Spring Meetings (Berlin 2018, Rostock 2019) and the nanoGe Fall Meeting 2018.
- **Public outreach (selection):** Scientific advisor for the museum “Futurium” in Berlin (since 2017). Interviews for “Naked Scientists” (Cambridge, UK), “Frankfurter Allgemeine Zeitung” (Germany), “Augsburger Allgemeine” (Augsburg, Germany), “Lausitzer Rundschau” (Cottbus, Germany), “Solarthemen” (Löhne, Germany), “IEEE Spectrum” (New York, USA), “P.M. Magazin” (Hamburg, Germany), Deutschlandfunk (Germany). Featured in the book “Ideen täglich. Wissenschaft in Berlin” by K. Vaillant and E. Fessler, *Nicolai Publishing Berlin* (2010). On-stage interview with “Project BeVoice” (Theatre from the Netherlands/Germany, play on science, 2015).

## Invited talks

1. “Towards Negative Emissions through Photoelectrochemical Methods: The NETPEC Project”. Together with K. Rehfeld. *Arctic Circle Assembly, Iceland*. (2021).
2. “Artificial photosynthesis: From solar fuels to negative emissions”. *Institute of Environmental Physics Colloquium, Heidelberg University, Germany*. (2019).
3. “Challenges and Opportunities of Water Splitting with Multi-Junction Solar Absorbers”. *nanoGe Fall Meeting, Torremolinos, Spain*. (2018).
4. “III–V Semiconductor Surfaces for Photoelectrochemical Energy Conversion”. *FG Surface Science Seminar, Technical University of Darmstadt, Germany*. (2017).
5. “In-situ Formation of Nano-Dimensioned Interface Layers for Efficient Water Photolysis”. *5th International Conference from Nanoparticles and Nanomaterials to Nanodevices and Nanosystems, Porto Heli, Greece*. (2016).
6. “Artificial Photosynthesis: Efficient Water Splitting with Surface-Functionalised Tandem Absorbers”. *Seminar “Regenerative Energien: Grundlagen und Anwendungen”, TU Cottbus, Germany*. (2015).
7. “III-V Semiconductor Surfaces for Solar Water Splitting”. *Adlershofer Forschungsforum, Berlin, Germany*. (2014).

## Most relevant peer-reviewed publications

1. M. Kölbach, K. Rehfeld, and M. M. May. Efficiency gains for thermally coupled solar hydrogen production in extreme cold. *Energy & Environmental Science* **14** (2021), pp. 4410–4417. DOI: 10.1039/d1ee00650a.

2. **M. M. May** and K. Rehfeld. ESD Ideas: Photoelectrochemical carbon removal as negative emission technology. *Earth System Dynamics* **10**(1) (2019), pp. 1–7. DOI: 10.5194/esd-10-1-2019.
3. **M. M. May** and M. Sprik. Water adsorption on the P-rich GaP(100) surface: Optical spectroscopy from first principles. *New Journal of Physics* **20**(3) (2018), p. 033031. DOI: 10.1088/1367-2630/aaaf38.
4. **M. M. May**, H.-J. Lewerenz, D. Lackner, F. Dimroth, and T. Hannappel. Efficient Direct Solar-to-Hydrogen Conversion by In Situ Interface Transformation of a Tandem Structure. *Nature Communications* **6** (2015), p. 8286. DOI: 10.1038/ncomms9286.
5. **M. M. May**, C. Brabetz, C. Janowitz, and R. Manzke. Charge-Density-Wave Phase of 1T-TiSe<sub>2</sub>: The Influence of Conduction Band Population. *Physical Review Letters* **107**(17) (2011), p. 176405. DOI: 10.1103/PhysRevLett.107.176405.