

Publications and invited talks

Online publication lists

- ORCID: www.orcid.org/0000-0002-1252-806X
- ResearcherID: <https://www.webofscience.com/wos/author/rid/H-8552-2013>
- Google Scholar: <https://scholar.google.com/citations?user=-8Y7CC8AAAAJ>

H-index (Web of Science/Google Scholar): 17/18.

Peer-reviewed articles

37. T Hannappel, S Shekarabi, W Jaegermann, E Runge, JP Hofmann, R van de Krol, **MM May**, A Paszuk, F Hess, A Bergmann, A Bund, C Cierpka, C Dreßler, F Dionigi, D Friedrich, M Favaro, S Krischok, M Kurniawan, K Lüdge, Y Lei, BR Cuenya, P Schaaf, R Schmidt-Grund, WG Schmidt, P Strasser, E Unger, MV Montoya, D Wang, and H Zhang. “Integration of multi-junction absorbers and catalysts for efficient solar-driven artificial leaf structures: a physical and materials science perspective”. *Solar RRL* **8**(11) (2024), p. 2301047. DOI: <https://doi.org/10.1002/solr.202301047>.
36. J Leist, J Kim, H Euchner, and **MM May**. “The relevance of structural variability in the time-domain for computational reflection anisotropy spectroscopy at solid-liquid interfaces”. *Journal of Physics: Condensed Matter* **36**(18) (2024), p. 185002. DOI: [10.1088/1361-648X/ad215b](https://doi.org/10.1088/1361-648X/ad215b).
35. M Guidat, M Löw, M Kölbach, J Kim, and **MM May**. “Experimental and Computational Aspects of Electrochemical Reflection Anisotropy Spectroscopy”. *ChemElectroChem* **10**(8) (2023), e202300027. DOI: [10.1002/ce1c.202300027](https://doi.org/10.1002/ce1c.202300027).
34. M Guidat, F Rahide, M Löw, J Kim, H Ehrenberg, S Dsoke, and **MM May**. “In Situ Monitoring of the Al(110)-[EMImCl]:AlCl₃ Interface by Reflection Anisotropy Spectroscopy”. *Batteries & Supercaps* **7** (2023). DOI: [10.1002/batt.202300394](https://doi.org/10.1002/batt.202300394).
33. EA Schmitt, M Guidat, M Nusshör, AL Renz, K Möller, M Flieg, D Lörch, M Kölbach, and **MM May**. “Photoelectrochemical Schlenk cell functionalization of multi-junction water-splitting photoelectrodes”. *Cell Reports Physical Science* **4**(10) (2023), p. 101606. DOI: [10.1016/j.xcrp.2023.101606](https://doi.org/10.1016/j.xcrp.2023.101606).
32. J Kim and **MM May**. “Resta-like preconditioning for self-consistent field iterations in the linearized augmented planewave method”. *Electronic Structure* **4**(4) (2022), p. 047003. DOI: [10.1088/2516-1075/aca24a](https://doi.org/10.1088/2516-1075/aca24a).
31. M Kölbach, O Höhn, K Rehfeld, M Finkbeiner, J Barry, and **MM May**. “The annual-hydrogen-yield-climatic-response ratio: evaluating the real-life performance of integrated solar water splitting devices”. *Sustainable Energy Fuels* **6** (2022), pp. 4062–4074. DOI: [10.1039/D2SE00561A](https://doi.org/10.1039/D2SE00561A).
30. M Löw, M Guidat, J Kim, and **MM May**. “The Interfacial Structure of InP(100) in Contact with HCl and H₂SO₄ studied by Reflection Anisotropy Spectroscopy”. *RSC Advances* **12**(50) (2022), pp. 32756–32764. DOI: [10.1039/d2ra05159a](https://doi.org/10.1039/d2ra05159a).
29. **MM May** and K Rehfeld. “Negative Emissions as the New Frontier of Photoelectrochemical CO₂ Reduction”. *Advanced Energy Materials* **12** (2022), p. 2103801. DOI: [10.1002/aenm.202103801](https://doi.org/10.1002/aenm.202103801).
28. **MM May** and W Jaegermann. “Combining experimental and computational methods to unravel the dynamical structure of photoelectrosynthetic interfaces”. *Current Opinion in Electrochemistry* **34** (2022), p. 100968. DOI: [10.1016/j.coelec.2022.100968](https://doi.org/10.1016/j.coelec.2022.100968).
27. M Schleuning, IY Ahmet, R van de Krol, and **MM May**. “The role of selective contacts and built-in field for charge separation and transport in photoelectrochemical devices”. *Sustainable Energy Fuels* **6** (2022), pp. 3701–3716. DOI: [10.1039/D2SE00562J](https://doi.org/10.1039/D2SE00562J).
26. M Kölbach, K Rehfeld, and **MM May**. “Efficiency gains for thermally coupled solar hydrogen production in extreme cold”. *Energy & Environmental Science* **14** (2021), pp. 4410–4417. DOI: [10.1039/d1ee00650a](https://doi.org/10.1039/d1ee00650a).

25. M Kölbach, C Özen, O Höhn, D Lackner, M Feifel, FF Abdi, and **MM May**. “Counterbalancing light absorption and ionic transport losses in the electrolyte for integrated solar water splitting with III–V/Si dual-junctions”. *Applied Physics Letters* **119**(8) (2021), p. 083904. DOI: 10.1063/5.0060700.
24. A Paszuk, O Supplie, S Brückner, E Barrigón, **MM May**, M Nandy, A Gieß, A Dobrich, P Kleinschmidt, I Rey-Stolle, and T Hannappel. “Atomic surface control of Ge(100) in MOCVD reactors coated with (Ga)As residuals”. *Applied Surface Science* (2021), p. 150513. DOI: 10.1016/j.apsusc.2021.150513.
23. J Geiger, M Sprik, and **MM May**. “Band Positions of Anatase (001) and (101) Surfaces in Contact with Water from Density Functional Theory”. *Journal of Chemical Physics* **152**(19) (2020), p. 194706. DOI: 10.1063/5.0004779.
22. **MM 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.
21. **MM May**, H Stange, J Weinrich, T Hannappel, and O Supplie. “The impact of non-ideal surfaces on the solid-water interaction: a time-resolved adsorption study”. *SciPost Physics* **6** (2019), p. 58. DOI: 10.21468/SciPostPhys.6.5.058.
20. M Mohamed, **MM May**, M Kanis, M Brützam, R Uecker, R van de Krol, C Janowitz, and M Mulazzi. “The electronic structure and the formation of polarons in Mo-doped BiVO₄ measured by angle-resolved photoemission spectroscopy”. *RSC Advances* **9** (2019), pp. 15606–15614. DOI: 10.1039/C9RA01092K.
19. WH Cheng, MH Richter, **MM May**, J Ohlmann, D Lackner, F Dimroth, T Hannappel, HA Atwater, and HJ Lewerenz. “Monolithic Photoelectrochemical Device for 19% Direct Water Splitting”. *ACS Energy Letters* **3**(8) (2018), pp. 1795–1800. DOI: 10.1021/acsenergylett.8b00920.
18. **MM 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.
17. **MM May**, D Lackner, J Ohlmann, F Dimroth, R van de Krol, T Hannappel, and K Schwarzborg. “On the Benchmarking of Multi-Junction Photoelectrochemical Fuel Generating Devices”. *Sustainable Energy & Fuels* **1**(3) (2017), pp. 492–503. DOI: 10.1039/C6SE00083E.
16. O Supplie, **MM May**, S Brückner, N Brezhneva, T Hannappel, and EV Skorb. “In Situ Characterization of Interfaces Relevant for Efficient Photoinduced Reactions”. *Advanced Materials Interfaces* **4**(21) (2017), p. 1601118. DOI: 10.1002/admi.201601118.
15. O Romanyuk, O Supplie, T Susi, **MM May**, and T Hannappel. “Ab initio density functional theory study on the atomic and electronic structure of GaP/Si(001) heterointerfaces”. *Physical Review B* **94**(15) (2016), p. 155309. DOI: 10.1103/PhysRevB.94.155309.
14. **MM May**, HJ 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.
13. O Supplie, **MM May**, C Höhn, H Stange, A Müller, P Kleinschmidt, S Brückner, and T Hannappel. “Formation of GaP/Si(100) heterointerfaces in presence of inherent reactor residuals”. *ACS Applied Materials & Interfaces* **7**(18) (2015), pp. 9323–9327. DOI: 10.1021/acsami.5b02231.
12. O Supplie, **MM May**, P Kleinschmidt, A Nägelein, A Paszuk, S Brückner, and T Hannappel. “In situ controlled heteroepitaxy of single-domain GaP on As-modified Si(100)”. *APL Materials* **3**(12), 126110 (2015). DOI: 10.1063/1.4939005.
11. O Supplie, **MM May**, G Steinbach, O Romanyuk, F Grosse, A Nägelein, P Kleinschmidt, S Brückner, and T Hannappel. “Time-resolved in situ spectroscopy during formation of the GaP/Si(100) heterointerface”. *Journal of Physical Chemistry Letters* **6**(3) (2015), pp. 464–469. DOI: 10.1021/jz502526e.

10. **MM May**, HJ Lewerenz, and T Hannappel. "Optical in situ Study of InP(100) Surface Chemistry: Dissociative Adsorption of Water and Oxygen". *Journal of Physical Chemistry C* **118**(33) (2014), pp. 19032–19041. DOI: 10.1021/jp502955m.
9. A Ramírez, P Hillebrand, D Stellmach, **MM May**, P Bogdanoff, and S Fiechter. "Evaluation of MnO_x , Mn_2O_3 , and Mn_3O_4 Electrodeposited Films for the Oxygen Evolution Reaction of Water". *Journal of Physical Chemistry C* **118**(26) (2014), pp. 14073–14081. DOI: 10.1021/jp500939d.
8. P Sippel, O Supplie, **MM May**, R Eichberger, and T Hannappel. "Electronic structures of GaP(100) surface reconstructions probed with two-photon photoemission spectroscopy". *Physical Review B* **89** (2014), p. 165312. DOI: 10.1103/PhysRevB.89.165312.
7. O Supplie, S Brückner, O Romanyuk, H Döscher, C Höhn, **MM May**, P Kleinschmidt, F Grosse, and T Hannappel. "Atomic scale analysis of the GaP/Si(100) heterointerface by in situ reflection anisotropy spectroscopy and ab initio density functional theory". *Physical Review B* **90**(23) (2014), p. 235301. DOI: 10.1103/PhysRevB.90.235301.
6. O Supplie, **MM May**, H Stange, C Höhn, HJ Lewerenz, and T Hannappel. "Materials for light-induced water splitting: In situ controlled surface preparation of GaPN epilayers grown lattice-matched on Si(100)". *Journal of Applied Physics* **115**(11), 113509 (2014), p. 113509. DOI: 10.1063/1.4869121.
5. FF Abdi, TJ Savenije, **MM May**, B Dam, and R van de Krol. "The Origin of Slow Carrier Transport in BiVO_4 Thin Film Photoanodes: A Time-Resolved Microwave Conductivity Study". *Journal of Physical Chemistry Letters* **4**(16) (2013), pp. 2752–2757. DOI: 10.1021/jz4013257.
4. **MM May**, O Supplie, C Höhn, R van de Krol, HJ Lewerenz, and T Hannappel. "The interface of GaP(100) and H_2O studied by photoemission and reflection anisotropy spectroscopy". *New Journal of Physics* **15**(10) (2013), p. 103003. DOI: 10.1088/1367-2630/15/10/103003.
3. H Döscher, O Supplie, **MM May**, P Sippel, C Heine, AG Muñoz, R Eichberger, HJ Lewerenz, and T Hannappel. "Epitaxial III-V Films and Surfaces for Photoelectrocatalysis". *ChemPhysChem* **13**(12) (2012), pp. 2899–2909. DOI: 10.1002/cphc.201200390.
2. **MM May**, C Brabetz, C Janowitz, and R Manzke. "Charge-Density-Wave Phase of 1T- TiSe_2 : The Influence of Conduction Band Population". *Physical Review Letters* **107**(17) (2011), p. 176405. DOI: 10.1103/PhysRevLett.107.176405.
1. **MM May**, C Brabetz, C Janowitz, and R Manzke. "The influence of different growth conditions on the charge density wave transition of 1T- TiSe_2 ". *Journal of Electron Spectroscopy and Related Phenomena* **184**(3–6) (2011), pp. 180–183. DOI: 10.1016/j.elspec.2011.01.001.

Submitted papers & preprints

3. M Adam, T Kleinen, **MM May**, and K Rehfeld. "Land conversions not climate effects are the dominant consequence of sun-driven CO_2 capture, conversion and sequestration". *submitted* (2024).
2. D Lörch, AGA Mohamed, H Euchner, J Timm, J Hiller, P Bogdanoff, and **MM May**. "From CO_2 to solid carbon: reaction mechanism, active species, and conditioning the Ce-alloyed GaInSn catalyst". *ChemRxiv preprint* (2024). DOI: 10.26434/chemrxiv-2024-1t2ss.
1. M Löw and **MM May**. "Operando investigation of Al plating regimes on HOPG in $[\text{EMImCl}]:\text{AlCl}_3$ by electrochemical reflection anisotropy spectroscopy". *submitted* (2024).

Non-peer-reviewed articles and data publications

9. M Kölbach, O Höhn, K Rehfeld, M Finkbeiner, J Barry, and **MM May**. *Data set for "The annual-hydrogen-yield-climatic-response ratio: evaluating the real-life performance of integrated solar water splitting devices"*. Version 1. Zenodo, (2022). DOI: 10.5281/zenodo.7024844.
8. M Löw, M Guidat, J Kim, and **MM May**. *Data set for "The interfacial structure of InP(100) in contact with HCl and H_2SO_4 studied by reflection anisotropy spectroscopy"*. Zenodo, (2022). DOI: 10.5281/zenodo.7410144.

7. M May and M Kölbach. *YaSoFo - Yet Another SOLar Fuels Optimizer*. Version v1.5.1. (2022). DOI: 10.5281/zenodo.7326981.
6. **MM May**. “Effiziente Erzeugung regenerativer Brennstoffe über die solare Wasserspaltung”. *Naturwissenschaftliche Rundschau* **72**(1) (2019), pp. 10–15.
5. O Supplie, **MM May**, S Brückner, A Nägelein, P Kleinschmidt, and T Hannappel. “Watching the formation of the GaP/Si(100) heterointerface in situ”. In: *IEEE 42nd Photovoltaic Specialist Conference (PVSC)*. (2015). DOI: 10.1109/PVSC.2015.7356381.
4. O Supplie, S Brückner, **MM May**, and T Hannappel. “Scrutinising growth”. *Compound Semiconductor* **21**(5) (2015), pp. 57–59.
3. O Supplie, S Brückner, O Romanyuk, **MM May**, H Döscher, P Kleinschmidt, H Stange, A Döbrich, C Höhn, HJ Lewerenz, F Grosse, and T Hannappel. “An experimental-theoretical atomic-scale study - In situ analysis of III-V on Si(100) growth for hybrid solar cells”. In: *IEEE 40th Photovoltaic Specialist Conference (PVSC)*. (2014), pp. 2797–2799. DOI: 10.1109/PVSC.2014.6925510.
2. **MM May**, O Supplie, C Höhn, WD Zabka, HJ Lewerenz, R van de Krol, and T Hannappel. “Water-induced modifications of GaP(100) and InP(100) surfaces studied by photoelectron spectroscopy and reflection anisotropy spectroscopy”. Ed. by Y Kanai and D Prendergast. *Proceedings of SPIE* **8822** (2013), pp. 88220M-88220M-7. DOI: 10.1117/12.2026172.
1. O Supplie, H Döscher, **MM May**, and T Hannappel. “Heteroepitaxial III-V on Si(100) tandem absorbers structures for photoelectrolysis”. *AIP Conference Proceedings* **1568**(1) (2013), pp. 20–23. DOI: 10.1063/1.4848082.

Book chapters

3. A Hajduk, MA Zare Pour, A Paszuk, M Guidat, M Löw, F Ullmann, DC Moritz, JP Hofmann, S Krischok, E Runge, WG Schmidt, W Jaegermann, **MM May**, and T Hannappel. “(Photo)electrochemical Reactions on semiconductor surfaces, part B: III-V surfaces-atomic and electronic structure”. In: *Encyclopedia of Solid-Liquid Interfaces (First Edition)*. Ed. by K Wandelt and G Bussetti. First Edition. Oxford: Elsevier, (2023), pp. 120–156. DOI: 10.1016/B978-0-323-85669-0.00113-6.
2. **MM May**, H Döscher, and J Turner. “High-efficiency water splitting systems”. In: *Integrated Solar Fuel Generators*. Ed. by ID Sharp, HA Atwater, and HJ Lewerenz. The Royal Society of Chemistry, (2018). Chap. 12, pp. 454–499. DOI: 10.1039/9781788010313-00454.
1. T Hannappel, **MM May**, and HJ Lewerenz. “Epitaxial III-V Thin Film Absorbers: Preparation, Efficient InP Photocathodes and Routes to High Efficiency Tandem Structures”. In: *Photoelectrochemical Water Splitting: Materials, Processes and Architectures*. Ed. by HJ Lewerenz and L Peter. The Royal Society of Chemistry, (2013). Chap. 9, pp. 223–265. DOI: 10.1039/9781849737739-00223.

Invited talks

12. **MM May**. “Scaling up high efficiencies to larger photoelectrode areas by photoelectrochemical Schlenk cell functionalisation”. NanoGe MATSUS24, Barcelona, Spain. (2024).
11. **MM May** and H Euchner. “Electrochemical Reflection Anisotropy Spectroscopy on III-V Photoelectrodes and Al Batteries”. The 14th International Conference on Optics of Surfaces and Interfaces (OSI-14), Mautendorf, Austria. (2024).
10. **MM May**. “Das H2Demo Projekt: Demonstratoren für die direkte solare Wasserstoffherzeugung”. Wasserstoff Netzwerktreffen der Industrie- und Handelskammer Reutlingen. (2022).
9. **MM May**. “Shaping semiconductor-electrolyte interfaces for high efficiencies by photoelectrochemical processes”. US-German workshop series on artificial photosynthesis. (2022).
8. **MM May**. “Photoelectrolysis: Highly Integrated Solar-Driven Green Hydrogen Production”. EU Agenda Workshop on Green Hydrogen, Rome, Italy. (2021).

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

Patents

2. **MM May**, T Hannappel, and HJ Lewerenz. “Photoelektrochemische Zelle zur lichtinduzierten Wasserspaltung”. German. DE 10 2016 119 634 A8; WO 2018068953 A1; EP 3526370B1; US 11,293,108 B2. (2021).
1. **MM May**, HJ Lewerenz, and T Hannappel. “Verfahren zum Herstellen einer Photoelektrode zur Wasserstoffentwicklung”. German. DE 10 2014 105 545 B3. (2015).

Tübingen, 11th September, 2024