BENJAMIN MOSS

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POSITIONS HELD

Imperial College London
◇ Schmidt A.I in Science Fellow. iX institute. *September 2023 - present*
◇ Research associate, Stephens group, Department of Materials. *September 2022 - present*
◇ Research associate, Durrant group, Department of Chemistry. *January 2021 - September 2022*

EDUCATION

Imperial College London *September 2014 - present*

◇ PhD - *awarded PhD prize for outstanding performance.* *June 2016 - November 2020*
Supervised by Professor James Durrant.
◇ MRes in Green Chemistry *(Distinction).* *September 2014 - 2015*

University of Edinburgh *September 2010-2014*
◇ Bachelor of Science, Chemistry - *First Class. Graduated first in year.* *September 2010-2014*

PRIZES AND AWARDS

◇ **Lindemann Fellowship** (£ 110,000) UK wide competition with 3 prizes awarded annually. *May 2023*
◇ **iX Schmidt A.I in Science Fellowship** (£ 120,000) UK wide competition with 10 prizes awarded annually. *December 2022*
◇ **Edward Steers award** (£7000) UK wide competition with 2-3 prizes awarded annually. *June 2022*
◇ **Awarded 24 h Beam Time (Value ca. £40k,) at Diamond light source.** *January 2022*
◇ UK doctoral research awards - finalist for best UK chemistry PhD. *September 2021*
◇ **Imperial College Chemistry PhD prize.** *March 2021*
◇ Talk prize. Society of Chemical Industry functional surfaces conference. London. *July 2019*
◇ SuperSolar International Conference bursary. *(£500).* *May 2019*
◇ Poster prize. Imperial College London Graduate Symposium. *July 2018*
◇ Science and Technology Facilities Council Impedance Summer School Scholarship at the University of Bath. *(£1050)* *July 2017*
◇ **Solar Fuels Network bilateral exchange bursary** to work in the Domen Group at the University of Tokyo. *(£2000, UK wide competition.)* *March 2017*
◇ Solar Fuels Network travel grant to attend Fotofuel Almeria. *(£500)* *September 2016*
◇ Engineering and Physical Sciences Research Council doctoral training partnership. June 2016
◇ **Imperial College Green chemistry scholarship** *(£4000, global competition.)* *January 2015*
◇ **Edinburgh University Chemistry BSc prize.** *(Best overall academic performance.)* *August 2014*

TECHNICAL ACHIEVEMENTS

Instruments Built:
◇ Microsecond transient reflectance and transmittance spectrometer and accompanying software.
◇ Potential resolved Vis/NIR transmittance and reflectance spectroscope and accompanying software-see upcoming first author and named author publications with Liang and He.
◇ Operando photolumiscence quantum yield system and accompanying software - for output see named author publication with Xu.

◇ **Founder of the open source spectroscopy project.** This project aims to make cutting edge operando spectroscopy hardware schematics, software and analysis methods freely available and easily accessible to non-specialist researchers.
Please visit `http://opensourcespectroscopy.com/` for details.

TEACHING AND MENTORING

◇ **Mentor for In2Research - supporting students from disadvantaged backgrounds with research experiences including applying for postgraduate research study and navigating research environments.**
◇ Volunteer tutor - 7 years tutoring at school level (Reference: Mr Iain D'Costa +447951472376).
◇ 2 years lab demonstration at Imperial College (groups of ca. 15).
◇ Year 2 thermodynamics tutorials at Imperial College (group of 6).
◇ Year 2 quantum mechanics tutorials at Imperial College (group of 7).
◇ Undergraduate admissions interviewer (ICL). *With the mentorship of Dr Carlotte Sutherell, I gained experience interviewing neurodiverse candidates.*
◇ Supervision of PhD students: Ms. Anna Wilson, Ms. Louise Oldham and Mr Tianhao He.
◇ Supervision of MRes students (Ms. Louise Oldham, Mr Yifeng Wang).

ORGANISATION

◇ Coordinator for the Durrant group on an EU project (SUN2CHEM).
◇ Co-organiser of a EU project meeting (A-LEAF).
◇ Board member of the Society For Chemical Industry early carrier committee.

SELECTED PRESENTATIONS

◇ Invited talk, California Institute of Technology *Talk title: Cooperative effects in electrocatalysts.* *January 2023*
◇ Invited talk, University of Oregon *June 2022*
Talk title: Cooperative effects in cobalt electrocatalysts.
◇ Invited talk, Stanford University. *June 2022*
Talk title: Cooperative effects in cobalt electrocatalysts.
◇ NanoGe spring meeting - Electrocatalysis for the Production of Fuels and Chemicals. *March 2022*
Talk title: Cooperative effects in cobalt electrocatalysts.
◇ Society of Chemical Industry functional surfaces conference. London. *July 2019*
Talk title: Understanding surface electronic structure changes in the low-cost and scalable "photocatalyst sheet" water splitting architecture.
◇ European Materials Research Society spring meeting, Nice. *May 2019*
Talk title: Design concepts in photocatalyst sheet water splitting devices.
◇ International Photochemistry Symposium, Heifei. *July 2018*
Talk title: d-orbital correlation: unravelling a key design concept behind the efficient, low-cost and scalable 'photocatalyst sheet' water splitting architecture.
◇ FotoFuel, Almeria. *October 2016*
◇ UK and Ireland Semiconductor Photochemistry Network London. *September 2016*
Talk title: charge carrier dynamics in the polymorphs of TiO_2

PUBLICATIONS.
(H-INDEX=12, 658 CITATIONS, 7 ARTICLES REVIEWED, 2 CORRESPONDING AUTHOR ARTICLES)

Work using new potential resolved spectroscopy sysytem to be submitted in the next 3 months:

- **Moss, B.**, Svane, L., Nieto, D., Rao, R. R., Sachs, M. R., Tseng, C., Pennathur, A., Liang, C., Mazzolini, E., Oldham, L., Sankar, G., Scott., S Dawlaty, J., Rossmeisl, J., Galan-Mascaros, J. R., Stephens I. E. L., Durrant, J. Cooperative effects drive current water oxidation catalysis in cobalt electrocatalysts through the destabilisation of intermediates. Target journal: Journal of the American Chemical Society.
- Liang, C., Rao, R, R.,, Svane, K. L., Haddena, J. H., **Moss, B.,** Scott, S., Sachs M. RR., Murawski, J., Malthe, A., Frandsen, A., Riley, J., Ryan, M. P., Rossmeisl, J., , J. R., Durrant, J., Stephens I. E. L. Unravelling the effects of active site densities and energetics on water oxidation activity of iridium oxides. Target journal: Nature Catalysis
- **Moss*, B. Liang, C., Rao, R. R. Durrant, J, R.,** Open source time and potential resolved visible and near-IR transmittance and reflectance spectroscopy with superior sensitivity accurately resolves the population of electrocatalytic surface intermediates and reproduces the J-V curve. Invited publication for Small Methods. **I am co-corresponding author on this work**

Accepted

1. Xu, W., Hart, L J. F., **Moss, B**, Caprioglio, P., Macdonald, T. J., Furlan, F., Panidi, J., Oliver, R. D .J, Pacalaj, R Heeney M., Gasparini, N., Snaith, H. J., Barnes, P. R. F., Durrant, J. R. Impact of Interface Energetic Alignment and Mobile Ions on Charge Carrier Accumulation and Extraction in p-i-n Perovskite Solar Cells . Advanced Energy Materials .2023,13, 2301102
2. Guo, J., **Moss, B**., Clarke, T. M., Quantifying triplet formation in conjugated polymer/non-fullerene acceptor blends. Journal of Materials Chemistry A 2022 (advance article)
3. Schukraft, G.E.M., **Moss, B**., Kafizas, A.G., Petit, C., Effect of Band Bending in Photoactive MOF-Based Heterojunctions. ACS Applied Materials and Interfaces 2022, 14, 17, 19342–19352
4. Pinto, F., Wilson, A., **Moss, B.,** and Kafizas, A., Systematic Exploration of WO_3/TiO_2 Heterojunction Phase Space for Applications in Photoelectrochemical Water Splitting. Journal of Physical Chemistry C, 2022, 126, 2, 871–884
5. **Moss, B.**, Babacan, O., Kafizas, A., Hankin, A. A Review of Inorganic Photoelectrode Developments and Reactor Scale-Up Challenges for Solar Hydrogen Production. **Advanced Energy Materials, 2021, 2003286.**
6. **Moss, B.**, Wang, Q., Butler, K.T., Grau-Crespo, R., Selim, S., Regoutz, A., Hisatomi, T., Godin, R., Payne, D. J. Kafizas, A., Domen, K.,Steier, L., Durrant, J.R. Linking in situ charge accumulation to electronic structure in doped $SrTiO_3$ reveals design principles for hydrogen-evolving photocatalysts. **Nature materials**, 2021, 20, 511–517
7. Mesa, C. A., Steier, L., **Moss, B.**, Francas, L., Thorne, J. E., Gratzel, M., Durrant, J. R. Impact of the Synthesis Route on the Water Oxidation Kinetics of Hematite Photoanodes Journal of Physical Chemistry Letters, 2020, 11, 17, 7285-7290
8. **Moss, B.***, Le, H., Corby, S., Morita, K., Selim, S., Sotelo-Vazquez, C., Chen, Y., Borthwick, A., Wilson, A., Blackman, C., Durrant, J. R., Walsh, A., Kafizas, A. Anisotropic Electron Transport Limits Performance of Bi_2WO_6 Photoanodes The Journal of Physical Chemistry C, 2020, 124, 35, 18859-18867. **I am co-corresponding author for this work**
9. Drosos, C., **Moss, B.**, Kafizas, A., Vernardou. D. V_2O_5 as magnesium cathode material with extended cyclic stability. Journal of Electrochemical Science and Engineering 2020, 10, 3, 257-262

10. Corby, S., Tecedor, M. G., Tengeler, S., Steinert, C., **Moss, B.**, Mesa, C. A., Heiba, H. F., Wilson, A., Kaiser, B., Jaegermann, W., Francas, L., Gimenez, S., Durrant. J. R. Separating bulk and surface processes in NiO_x electrocatalysts for water oxidation. Sustainable Energy and Fuels, 2020, 4, 10, 5024-5030

11. Selim, S., Pastor, E., Tecedor, M. G., Morris, M R., Francas, L., Sachs, M., **Moss, B.**, Corby, S., Mesa, C. A., Gimenez, S., Kafizas, A, Bakulin, A. A., Durrant. J. R. Impact of Oxygen Vacancy Occupancy on Charge Carrier Dynamics in $BiVO_4$ Photoanodes. Journal of the American Chemical Society, 2019, 141, 47, 18791-18798

12. Yang, W., Godin, R., Kasap, H., **Moss, B.**, Dong, Y., Hillman, S.A.J., Steier, L., Reisner, E., Durrant, J.R. Electron accumulation induces efficiency bottleneck for hydrogen production in carbon nitride photocatalysts. Journal of the American Chemical Society 2019, 141, 28, 11219-11229

13. Crake, A., Christoforidis, K. C., Gregg, A., **Moss, B.**, Kafizas, A., Petit, C. The Effect of Materials Architecture in TiO_2/MOF Composites on CO_2 Photoreduction and Charge Transfer. Small, 2019, 15, 1805473

14. Crake, A., Christoforidis, K. C., Godin, R., **Moss, B.**, Kafizas, A., Zafeiratos, S., Durrant, J.R., Petit, C. Titanium dioxide/carbon nitride nanosheet nanocomposites for gas phase CO_2 photoreduction under UV-visible irradiation. Applied Catalysis B: Environmental, 2019, 242 369–378371.

15. **Moss, B.**, Hegner, F. S., Corby, S., Selim, S., Francas, L., Lopez, L., Gimenez, S., Galan-Mascaro, J. R., Durrant, J. R. Unraveling Charge Transfer in CoFe Prussian Blue Modified $BiVO_4$ Photoanodes. ACS Energy Letters, 2019, 4, 1, 337–342.

16. He, G., Han, X., **Moss, B.**, Weng, Z., Gadipelli, S., Lai, F., Kafizas, A., Brett, D.J.L., Guo, Z. X., Wang, H., Parkin, I. P. Solid solution nitride/carbon nanotube hybrids enhance electrocatalysis of oxygen in zinc-air batteries. Energy Storage Materials, 15, 2018, 380-387.

17. Drosos, C., Jia, C., Mathew, S., Palgrave, R. G., **Moss, B.**, Kafizas, A., Vernardou D. Aerosol-assisted chemical vapor deposition of V_2O_5 cathodes with high rate capabilities for magnesium-ion batteries. Journal of Power Sources, 2018, 384, 355–359357.

18. **Moss, B**., Lim, K.K., Beltram, A. Monitz, S., Tang, J., Fornasiero, P., Barnes, P., Durrant, J. R. Comparing photoelectrochemical water oxidation, recombination kinetics and charge trapping in the three polymorphs of TiO_2. Scientific Reports, 2017, 7, 2938.