

Aron Huckaba, PhD

Curriculum Vitae

DEGREES AND COMPLETED COURSES AND PROGRAMS

Ecole Polytechnique Federale de Lausanne, Sion, VS, CH, Employment July 2015-present.
Post-Doctoral Researcher, Synthesis Team and Group Leader, Certified Safety Officer (SUVA)
Mentor: Mohammad K. Nazeeruddin

The University of Mississippi, Oxford, MS, Jun 2011-May 2015 (Defense March 27, 2015)
PhD in Chemistry
Advisors: T. Keith Hollis (Jun 2011-Jun 2013), Jared Delcamp (Jul 2013-2015)

Murray State University, Murray, KY, Aug 2007 – May 2011
B.S. in Chemistry, Departmental Honors, University Honors
Advisor: Kevin Revell

GRANT WRITING EXPERIENCE

Grants Awarded

“Development of Molecularly Engineered Interface Materials for Stable Perovskite Solar Cells” US Army CERDEC Division (24 mo., 240K USD, 12 mo. 120K extension)

“Engineering of Stable Perovskite Materials and Interfaces for Optoelectronic Applications” European Research Council (60 mo., 2.5 mill Euros total, 400K CHF)

“SmArt Designed Full Printed Flexible RObust Efficient Organic HaLide PerOvskite solar cells (APOLO)” Horizon 2020 (36 mo., 500K CHF).

“FlexPSC” Toyota Motor Corporation (12 mo., 106K CHF, extended another 12 mo. 106K).

PATENTS

- 1) **Huckaba, A.J.**, Delcamp, J.H. “Indolizine-Based Dyes for Dye-Sensitized Solar Cells.” US. Provisional Patent Award 62031031.
- 2) Rakstys, K. **Huckaba, A.J.**, Nazeeruddin M.K. “Triazatruxene Materials for Optoelectronics Applications.” Patent Pending, EPFL 2017.

FIRST AUTHOR PUBLICATIONS

16) **Huckaba, A.J.**; Lee, Y.; Xia, R.; Paek, S.; Bassetto, V.C.; Oveisi, E.; Lesch, A.; Kinge, S.; Dyson, P.J.; Girault, H.; Nazeeruddin, M.K. “Inkjet-Printed Mesoporous TiO₂ and Perovskite Layers for High Efficiency Perovskite Solar Cells.” *Manuscript Deposited on ChemRxiv 25 Sep 2018. doi.org/10.26434/chemrxiv.7127066.v1 Manuscript Submitted. Manuscript Accepted for Publication in Energy Technology.*

15) **Huckaba, A.J.**; Shirley, H.; Lamb, R.; Guertin, S.; Aurtry, S.; Cheema, H.; Talukdar, K.; Jones, T.; Jurss, J. W.; Dass, A.; Hammer, N. I.; Schmehl, R. H.; Webster, C. E.; Delcamp, J. H. “An Air-Stable Mononuclear Tungsten Photocatalyst for H₂ Production.” *ACS Catalysis* **2018**, 8, 4838-4847.

14) **Huckaba, A.J.**; Senes, A.; Agahazada, S.; Babaei, A.; Meskers, S. C. J.; Zimmermann, I.; Schouwink, P.; Gasilova, N.; Janssen, R. A. J.; Bolink, H.; Nazeeruddin, M. K. “Exploration of Bis(Arylimidazole) Iridium Picolinate Complexes” *ACS Omega* **2018**, 3, 2673-2682, *First Deposited on ChemRxiv (2017) doi:10.26434/chemrxiv.5331460.v1. *Graduate Student Mentee*

13) **Huckaba, A.J.**; Ralaiarosa, M.; Cho, K.T.; Koch, N.; Nazeeruddin, M.K. “Intercalation Makes the Difference with TiS₂: Boosting Electrocatalytic Water Oxidation Activity Through Co Incorporation.” *Journal of Materials Research (Invited Article)*. **2017**, 33, 5, 528-537.

12) **Huckaba, A.J.**; **Gharibzadeh, S.**; Ralaiarisoa, M.; Roldano-Carmona, C.; Grancini, G.; Lee, Y.; Amsalem, P.; Mohammadian, N.; Plichta, E. J.; Koch, N.; Mashaii, A.; Nazeeruddin, M.K. “TiS₂ Hole Transport Material for Perovskite Solar Cells.” *Small Methods*. **2017**, 1700250. **Graduate Student Mentee*

11) **Huckaba, A.J.**; Paek, S. H.; Grancini, G.; Bastola, E.; Cho, K. T.; Lee, Y. H.; Bhandari, K. P.; Baliff, C.; Ellingson, R. J.; Nazeeruddin, M. K. “Exceedingly Cheap Perovskite Solar Cells Using Iron Pyrite Hole Transport Materials.” *ChemistrySelect* **2016**, *Published Online October 12, 2016.*

- 10) **Aghazada, S.†**; **Huckaba, A. J.†**; Pertegas Ojeda, A.; Babaei, A.; Grancini, G.; Zimmermann, I.; Bolink, H.; Nazeeruddin, M. K. "Molecular Engineering of Iridium Blue Emitters Using Aryl N-Heterocyclic Carbene Ligands." *European Journal of Inorganic Chemistry* **2016**, 32, 5089-5097. **Graduate Student Mentee*
- 9) **Huckaba, A.J.**; Nazeeruddin, M.K.; "Strategies for Tuning Emission Energy in Phosphorescent Ir (III) Complexes." *Comments on Inorganic Chemistry* **2016**, 1-29.
- 8) **Huckaba, A.J.**; Yella, A.; McNamara, L. E.; Steen, A. E.; **Murphy, J. S.**; Carpenter, C.; **Puneky, G.D.**; Hammer, N. I.; Nazeeruddin, M. K.; Grätzel, M.; Delcamp, J. H. "Molecular Design Principles for Near-Infrared Absorbing and Emitting Indolizine Dyes." *Chemistry – A European Journal* **2016**, 22, 43, 15536-15542. **Undergraduate Student Mentee*
- 7) **Huckaba, A. J.**; Yella, A.; Brogdon, P.; **Murphy, J. S.**; Nazeeruddin, M. K.; Grätzel, M.; Delcamp, J. H. "A Low Recombination Rate Sensitizer for Dye-Sensitized Solar Cells." *Chemical Communications* **2016**, 52, 8424-8427. **Undergraduate Student Mentee*
- 6) **Huckaba, A. J.**; **Sharpe, E. A.**; Delcamp, J. H. "Photocatalytic Reduction of CO₂ with Re-Pyridyl-NHCs." *Inorganic Chemistry* **2015**, 55, 2, 682-690. **Undergraduate Student Mentee*
- 5) **Huckaba, A.J.†**, Giordano, F.† McNamara, L. E., Dreux, K. Hammer, N. I., Tchumper, G. S., Zakeeruddin, S. M., Gratzel, M., Nazeeruddin, M. K., Delcamp, J. H. "Indolizine-Based Donors as Organic Sensitizer Coponents for Dye-Sensitized Solar Cells." *Advanced Energy Materials* **2015**, 5, 7.
- 4) **Huckaba, A. J.**; Hollis, T. K.; Reilly, S. W. "Homobimetallic Rh NHC Complexes as Versatile Catalysts for Hydrosilylation of a Multitude of Substrates in the Presence of Ambient Air." *Organometallics* **2013** 32, 21, 6248-6256.
- 3) **Huckaba, A. J.**; Cao, B.; Hollis, T. K.; Valle, H. U.; Kelly, J. T.; Hammer, N. I.; Oliver, A. G.; Webster, C. E. "Platinum CCC-NHC benzimidazolyl pincer complexes: synthesis, characterization, photostability, and theoretical investigation of a blue-green emitter." *Dalton Trans.* **2013**, 42, 8820.
- 2) **Huckaba, A. J.**; Hollis, T. K.; **Howell, T. O.**; Valle, H. U.; Wu, Y. "Synthesis and Characterization of a 1,3-Phenylene-Bridged N-Alkyl Bis(benzimidazole) CCC-NHC Pincer Ligand Precursor: Homobimetallic Silver and Rhodium Complexes and the Catalytic Hydrosilylation of Phenylacetylene." *Organometallics* **2013**, 32, 63. **Undergraduate Student Mentee*
- 1) Erwin, S. †; **Huckaba, A. J.†**; He, K. S.; McCarthy, M. "Matrix Model analysis of Invasive Plant Species Alternanthera Philoxeroides," *Journal of Plant Ecology* **2012**, 6, 150.

†: indicates shared first-authorship.

OTHER PUBLICATIONS

- 15) Kim, M.; Lee, S.Y.; Yoo, S.M.; Pae, S.H.k; Lee, Y.H.; Cho, K.T.; Zimmermann, I.; Kim, H.Y.; Kim, B.S.; Song, M.K.; Shin, T.H.; Kim, K.S.; Huckaba, A.J.; Lee, H.J., Nazeeruddin, M.K. "Growing Nanoscale CH₃NH₃PbI₃ Perovskite Sensitizers for Mesoporous TiO₂-Based Solar Cells with Successive Precursor Layer Adsorption and Reaction (SPLAR) Process." *Submitted*.
- 14) Peng, L.; Yang S.; Jawahery, S.; Moosave, S. M.; **Huckaba, A.J.**; Asgari, M.; Oveisi, E.; Nazeeruddin, M.K.; Smit, B.; Queen, W.L. "Preserving Porosity of Metal-Organic Frameworks by Introducing Polymer Guest into Hierarchical Micro- and Mesoporous MOFs." *Manuscript Published online in Journal of the American Chemical Society*..
- 13) Abuhelaiqa, M.; Paek, S.H.; Lee, Y.H.; Heo, S.; Oveisi, E.; **Huckaba, A.J.**; Kanda, H.; Kim, H.B.; Zhang, Y.; Humphry-Baker, R.; Kinge, S.; Asiri, A.; Nazeeruddin, M.K.; "Stable perovskite solar cells using tin acetylacetonate based electron transporting layers." *Energy & Environmental Science. Advance Article doi: 10.1039/C9EE00453J*.
- 12) Hallani, R. K.; Hamidabdi, V.F.; **Huckaba, A.J.**, Galliani, G.; Babaei, A; La-Placa, M.G.; Bahari, A.; Sessolo, M.; Nazeeruddin, M.K.; McCulloch, I.; Bolink, H.J. "New cross-linkable 9,10-diphenylanthracene derivative as wide bandgap host for solution-processed organic light-emitting diodes." *Journal of Materials Chemistry C*. **2018**, 6, 12948-12954.
- 11) Babaei, A.; **Rakstys, K.**; Guelen, S.; Fallah Hamidabadi, V.; La-Placa, M.-G.; Martínez-Sarti, L.; Sessolo, M.; **Huckaba, A.J.**; Gaudin, O. P. M.; Schanen, V.; Nazeeruddin, M.K.; Bolink, H.J. "Solution Processed Organic Light-Emitting Diodes Using a Triazatruxene Crosslinkable Hole Transporting Material." *RSC Adv.* **2018**, 8, 62, 35719–35723. **Graduate Student Mentee*
- 10) **Drigo, N.**; Kudriashova, L.; Weißenseel, S.; Sperlich, A.; **Huckaba, A.J.**; Nazeeruddin, M.K.; Dyakonov, V. "Photophysics of Deep Blue Acridane- and Benzonitrile-Based Emitter Employing Thermally Activated Delayed Fluorescence." *The Journal of Physical Chemistry, Part C. Published on the Web September. 13 2018, doi: 10.1021/acs.jpcc.8b08716*. **Graduate Student Mentee*

9) Lee, H.J.; Cho, K.T.; Paek, S.H.; Lee Y.H.; **Huckaba, A.J.**; Quelo, V.E.; Zimmermann, I.; Grancini, G.; Oveisi, O.; Yoo, S.M.; Lee, S.Y.; Shin, T.H.; Kim, M.; Nazeeruddin, M.K. "A Facile Preparative Route of Nanoscale Perovskites over Mesoporous Metal Oxide Films and Their Applications to Photosensitizers and Light-Emitters." *Adv. Functional Mater. Published on the Web August 1, 2018*, doi:10.1002/adfm.201803801.

8) Lee, Y.; Lee, S.; Seo, G.; Paek, S.; Cho, K.T.; **Huckaba A.J.**, Calizzi M., Choi D.W.; Park, J.S.; Lee D.; Lee H.J.; Asiri, A.M.; Nazeeruddin, M.K. "Efficient Planar Perovskite Solar Cells Using Passivated Tin Oxide as an Electron Transport Layer." *Advanced Science*. **2018**, Published on the Web 25 March 2018, doi:10.1002/adv.201800130.

7) **Drigo, N.**; Paek, S. H.; **Huckaba, A.J.**; Schouwink, P.; Nazeeruddin, M.K. "Approaches for selective synthesis of ullazine donor-acceptor systems." *Chem. Eur. J.* **2017**, 23, 17209. **Graduate Student Mentee*

6) L. E. McNamara, **T. A. Rill, A. J. Huckaba**, V. Ganeshraj, J. Gayton, R. A. Nelson, **E. A. Sharpe**, A. Dass, N. I. Hammer and J. H. Delcamp, "Indolizine-Squaraines: NIR Fluorescent Materials with Molecular Engineered Stokes Shifts," *Chemistry—A European Journal*, **2017**, 23, 51, 12494-12501. **Undergraduate Student Mentee*

5) Yusoff, A.R.B.M.; **Huckaba A. J.**; Nazeeruddin, M.K. "Phosphorescent Neutral Iridium (III) Complexes for Organic Light Emitting Diodes." *Topics in Current Chemistry* **2017**, 375, 2, 9.

4) Wu, K. L.; **Huckaba, A. J.**; Clifford, J.N.; Yang, Y. W.; Yella, A.; Palomeres, E.; Grätzel, M.; Chi, Y.; Nazeeruddin, M.K. "Molecularly Engineered Ru (II) Sensitizers Compatible with Cobalt (II/III) Redox Mediators for Dye-Sensitized Solar Cells." *Inorganic Chemistry* **2016**, 55, 15, 7388-7395.

3) Liyanage, N.P.; Dulaney, H.A.; **Huckaba, A.J.**; Jurss, J.W.; Delcamp, J. H. "Electrocatalytic Reduction of CO₂ to CO with Re-Pyridyl-NHCs: Proton source Influence on Rates and Product Selectivities." *Inorganic Chemistry* **2016**, 55, 12, 6085-6094.

2) Jupally, V. R.; Dharmaratne, A. C.; Crasto, D.; **Huckaba, A. J.**; Kumara, C.; Nimmala, P. R.; Kothalawala, N.; Delcamp, J. H.; Dass, A. "Au₁₃₇(SR)₅₆ Nanomolecules: Composition, Optical Spectroscopy, Electrochemistry, and Electrocatalytic Reduction of CO₂." *Chem. Commun.* **2014**, 50, 9895-9898.

1) **Howell, T.O.**; **Huckaba, A. J.**; Hollis, T. K. "An Efficient Synthesis of Bis-1,3-(3'-aryl-N-heterocycl-1'-yl)arenes as CCC-NHC Pincer Ligand Precursors." *Organic Letters* **2014** 16, 9, 2570-2572. **Undergraduate Student Mentee*

PRESENTATIONS

January 2019. "Development of Charge Transport Materials for Perovskite Solar Cells and Photocatalysts for the Reduction of Carbon Dioxide and Hydrogen Formation" Invited Seminar, University of Kentucky, Lexington, KY.

November 2018. "Towards Fully Inkjet-Printed Perovskite Solar Cells." MRS meeting, Boston MA.

September 2018. "Stable Perovskite Solar Cells by Compositional and Interface Engineering." Office of Naval Research Project Meeting, Atlanta GA.

September 2018. "Charge Transfer Materials for Photocatalysis." Invited Seminar, Albrecht Group, University of Bern, *Bern, Switzerland.*

April 2018. "Perovskite Solar Cells: A Paradigm Shifting New Technology." Salon International Des Inventions, Genève. *Geneva, Switzerland.*

January 2018. "Utilization of solar energy through catalysis and conversion." Invited Seminar, University of Southern Denmark, *Odense, Denmark.*

August 2017. "Molecular engineering of blue emitting iridium (III) complexes for use in fully solution processed OLEDs," ACS National Meeting, *Washington D.C.*

November 2015 (Lyon, France), June 2016 (Eindhoven, Netherlands), November 2016 (Valencia, Spain), June 2017 (London, England). "Progress Towards Blue Phosphorescent Emitters." SOLEDLIGHT Project Meetings.

May 2015. "Utilization of Solar Energy in Photochemical Reduction of CO₂ and Dye-Sensitized Solar Cells." Dissertation Seminar, *Oxford, MS.*

October 2014. "Indolizine-Based Donors as Organic Sensitizer Coponents for Dye-Sensitized Solar Cells." South Eastern Regional Meeting of the American Chemical Society, *Nashville, TN.*

January, 2011. "Using matrix analysis to model the spread of an invasive plant, "*alternanthera philoxeroides.*" " Joint Mathematics Meeting in *New Orleans, LA.*

August, 2010. "Correlation and cluster analysis in epidemiology" Mathfest National Convention, *Pittsburgh, PA.*

November, 2009. "Highly conjugated polyphenylene ethynyl oligomers" 95th KAS meeting, *Highland Heights, KY.*

POSTERS

September 2018. "Inkjet-Printed Perovskite Solar Cells." PSCO Conference, Lausanne, Switzerland.

June 2016. "Development of Blue-Emitting Iridium(III) Complexes with Electron-Rich Ligands." OLED Materials Workshop. Delft, Netherlands.

April 2014. "Dye-Sensitized Solar Cells Utilizing Indolizine Subunits as Donors: An Exceptionally Strong Donor." Mississippi EPSCoR Annual Meeting

February 18, 2014. “Dye-Sensitized Solar Cells Utilizing Indolizine Subunits as Donors: An Exceptionally Strong Donor.” Research Day at the Capitol, Jackson, Miss.

October, 2011. “Synthesis and Characterization of benzimidazolyl CCC-NHC pincer complexes.” National Center for Natural Products Research Poster Competition.

AWARDS

Undergraduate: Robertah Whitney Scholarship (2009)
Departmental Study Abroad Scholarship (2009)
Most Outstanding Chemistry Major (2011)
Honors Diploma (2011)

Post-Doctoral: Outstanding Research Award (2017)
Medaille D’Or Salon International Des Inventions Genève (2018)

SERVICE AND MEMBERSHIPS

Active Reviewer for: **Advanced Energy Materials, ChemPhysChem, MatChemPhys-D, International Journal of Photoenergy, Journal of Materials Research, .**

Community Service: **SprachenBar English Conversation Moderator (Sion, Dec. 2017-Dec 2019)**

Memberships in Professional Organizations: American Chemical Society (Since 2010), Materials Research Society (2018-2019), *Swiss Chemical Society (Nov 2019-2020)*