

Contact information

Anders B. Laursen

Nationality: Danish (Permanent Resident of the United States of America since 2014)

Current Position

Title: Post Doctoral Associate; IAMDN Postdoctoral Scholar (Honorary Rank)

Institution: The Department of Chemistry and Chemical Biology, Rutgers, the State University of New Jersey

Address: 610 Taylor Road, Room 109, Piscataway, New Jersey 08854, USA

Email Address: anders.laursen@rutgers.edu

H-index: 12 (link to Scopus)

Education and Training

Post Doctoral Associate**January 2013 – Present**

Description: Synthesis and characterization of nanomaterials for the electrocatalytic hydrogen evolution. Synthesizing nano-scale catalyst and evaluating their catalytic activity

Institution: The Department of Chemistry and Chemical Biology, Rutgers, the State University of New Jersey

Supervisor: Distinguished Professor G. Charles Dismukes

Ph.D. Studies**September 2009 – September 2012**

Thesis title: Nanoscale design of molybdenum sulfides for more efficient electro- and photoelectrocatalytic hydrogen evolution

Abstract: The project targeted the development of sustainable electrocatalysts, photoelectrocatalysts, and semiconductors for water splitting. Emphasis was on synthesizing nanomaterials of molybdenum sulfides, anchoring of molecular electrocatalysts on electrode surfaces, synthesizing semi-conductors of nitrides and oxy-nitrides, and synthesizing predicted metal oxides for the electrocatalytic oxygen evolution reaction. The work was done in the group Center for Individual Nanoparticle Functionality (Professor Ib Chorkendorff and Professor Søren Dahl) that specializes in the application of surface science research to the development and analysis of catalysts useful for the sustainable energy production, storage/conversion with an emphasis on electrochemistry and photocatalysis.

Supervisors: Professor Søren Dahl, Professor Ib Chorkendorff, and Associate Professor Peter C. K. Vesborg

Institution: The Department of Physics, Center for Individual Nanoparticle Functionality, Technical University of Denmark

M. Sc. Eng. in Advanced and Applied Chemistry**September 2007 – August 2009*****Specializing in Catalysis and Nanotechnology***

Thesis title: A study of “Plum-pudding”-Type Catalysts

Industrial collaborator on thesis: Haldor Topsøe A/S

Supervisor: Professor Jan-Dierk Grunwaldt (The Department of Chemical and Biochemical Engineering)

Co-supervisor: Professor Emeritus Claus Hviid Christensen (The Department of Chemistry)

Institution: The Department of Chemistry, Technical University of Denmark

B. Sc. Eng. in Chemistry and Technology**September 2004 – August 2007**

Thesis title: From Biomass to basis-chemicals

Supervisor: Professor Claus Hviid Christensen

Institution: The Department of Chemistry, Center for Sustainable and Green Chemistry, Technical University of Denmark

Language skills: Danish written and spoken (native), English written and spoken (fluent), German written and spoken (proficient).

Honors and Awards

Betty and Gordon Moore Foundation Inventor Fellowship**Rutgers’ nominee****February 2016**

Blavatnik Family Foundation award — Rutgers' nominee February 2015

**Catalysis Society of Metropolitan New York
Post Doc Poster Award March 2014**

Blavatnik Family Foundation award — Rutgers' nominee February 2014

IAMDN Postdoctoral Scholar January 2013 – Present

Institute for Advanced Materials, Devices, and Nanotechnology (IAMDN) Postdoctoral Scholar is an honorary rank awarded as an acknowledgement of the awardee's potential for interdisciplinary collaboration, and brings awareness of the extensive cohort of investigators and resources at Rutgers in the areas of materials science and engineering, catalysis, and interfaces

Henry and Mary Skov's foundation scholarship June 2008

Henry and Mary Skov's foundation scholarship June 2007

Speaker (invited and presenter)

- ACS Middle-Atlantic Regional Meeting, New York 2016 — Electrochemical H₂ Evolution on Crystalline Ni₃P and its Structural Activity Correlation to a Series of Nickel Phosphide Catalysts (Oral Presentation)
- Electrochemical Society, Annual Meeting, San Diego 2016 — Renewable H₂ Evolution Efficiency and Corrosion Tolerance of 5 Nickel Phosphide Crystalline Phases (Oral Presentation)
- Laboratory for Surface Modification, 30th Annual Symposium Piscataway 2016 — Electrochemical Hydrogen Evolution on a Low-Phosphorus Content Crystalline Phases of Nickel Phosphide (Oral Presentation)
- Catalysis Society of Metropolitan New York Annual Symposium 2015 — Hydrogen Evolution on Nickel Phosphide Electrocatalysts: An initial Comparative Study of Efficiency and Corrosion Tolerance (Oral presentation)
- 250th ACS Annual Symposium in Boston 2015 — Hydrogen Evolution on Nickel Phosphide (Oral presentation)
- Electrocatalysts: A Comparative Study of Efficiency and Corrosion Tolerance Philadelphia Inorganic Colloquium 2015 — Hydrogen Evolution on a complete series of Nickel Phosphide Electrocatalysts (Oral presentation)
- 29th Annual Symposium of the Laboratory for Surface Modification (Poster presentation)
- Catalysis Society of Metropolitan New York Monthly meeting January 2015 (Oral presentation)
- Solar Fuels Institute – Annual Meeting 2014 — Rutgers' advances through the SOFI 2014 demo project (Oral presentation)
- 28th Annual Symposium of the Laboratory for Surface Modification 2014 (Poster presentation)
- Catalysis Society of Metropolitan New York Annual Symposium 2014 (Poster presentation)
- Catalysis Society of Metropolitan New York Annual Symposium 2013 (Poster presentation)
- 27th Annual Symposium of the Laboratory for Surface Modification 2013 (Poster presentation)
- 243rd ACS Annual Symposium San Diego 2012 (Poster presentation)
- DTU-TUM-TU/e Graduate School on Sustainable Energy 2009 (Oral presentation)

Professional Appointments**Post Doctoral Associate**

at Rutgers, the State University of New Jersey

January 2013 – Present**Research Assistant**

at the Technical University of Denmark

September 2012 – November 2012**Publications (Peer-Reviewed)**

1. Smith, P, Hunt, L., **Laursen, A. B.**, Sagar, V., Kaushik, S. Calvino, K., Marotta, G., Mosconi, E., De Angelis, F., Dismukes, G. C. Water oxidation by the $[C_4O_4](OAc)_4(py)_4]^{4+}$ Cubium is Initiated by OH⁻ Addition. *J. Am. Chem. Soc.* 2015;137(49):15460–15468.
2. **Laursen, A. B.**, Patraju, K. R., Whitaker, M. J., Retuerto, M., Sarkar, T., Yao, N., Ramanujachary, K. V., Greenblatt, M., Dismukes, G. C. Nanocrystalline Ni₅P₄: A hydrogen evolution electrocatalyst of exceptional efficiency in both alkaline and acidic media. *Energy Environ. Sci.* 2015;8(3):1027-1034.
3. **Laursen, A. B.**, Pedersen, T., Malacrida, P., Seger, B., Hansen, O., Vesborg, P. C. K., & Chorkendorff, I. MoS₂-an integrated protective and active layer on n⁺p-Si for solar H₂ evolution. *Phys. Chem. Chem. Phys.* 2013;15(46): 20000–20004
4. Hou, Y., **Laursen, A. B.**, Zhang, J., Zhang, G., Zhu, Y., Wang, X., Dahl, S., Chorkendorff, I. Layered Nanojunctions for Hydrogen-Evolution Catalysis. *Angew. Chem. (Int. ED)*. 2013;125(13): 3709-3713
5. **Laursen, A. B.**, Vesborg, P. C. K., Chorkendorff, I. A high-porosity carbon molybdenum sulphide composite with enhanced electrochemical hydrogen evolution and stability. *Chem. Commun.* 2013;49(43):4965-4967
6. Seger, B., Pedersen, T., **Laursen, A. B.**, Vesborg, P. C. K., Hansen, O. & Chorkendorff, I. Using TiO₂ as a conductive protective layer for photocathodic H₂ evolution. *J. Am. Chem. Soc.* 2013;135(3):1057-1064
7. Cavalca, F., **Laursen, A. B.**, Wagner, J. B., Damsgaard, C. D., Chorkendorff, I., & Hansen, T. W. Light-Induced Reduction of Cuprous Oxide in an Environmental Transmission Electron Microscope. *ChemCatChem.* 2013;5(9):2667-2672
8. Zawadzki, P., **Laursen, A. B.**, Jacobsen, K. W., Dahl, S., Rossmeisl, J. Oxidative trends of TiO₂-hole trapping at anatase and rutile surfaces. *Energy Environ. Sci.* 2012;5(12):9866-9869
9. Seger, B., **Laursen, A. B.**, Vesborg, P. C. K., Pedersen, T., Hansen, O., Dahl, S., Chorkendorff, I. Hydrogen production using a molybdenum sulfide catalyst on a titanium-protected n⁺p-silicon photocathode. *Angew. Chem. (Int. ED)* 2012;51(36):9128-9131
10. **Laursen, A. B.**, Varela, A. S., Dionigi, F., Fanchiu, H., Miller, C. Trinhammer, O. L., Rossmeisl, J. & Dahl, S. Electrochemical Hydrogen Evolution: Sabatier's Principle and the Volcano Plot. *J. Chem. Educ.* 2012;89(12):1595-1599
11. **Laursen, A. B.**, Gorbanev, Y. Y., Cavalca, F., Malacrida, P., Kleiman-Schwarscstein, A., Kegnaes, S., Riisager, A., Chorkendorff, I., & Dahl, S. (2012). Highly dispersed supported ruthenium oxide as an aerobic catalyst for acetic acid synthesis. *Appl. Catal. A Gen.* 2012;433-434:243-250
12. **Laursen, A. B.**, Kegnaes, S., Dahl, S., & Chorkendorff, I. Molybdenum sulfides—efficient and viable materials for electro - and photoelectrocatalytic hydrogen evolution. *Energy Environ. Sci.* 2012;5(2):5577
13. Cavalca, F., **Laursen, A. B.**, Kardynal, B. E., Dunin-Borkowski, R. E., Dahl, S., Wagner, J. B., & Hansen, T. W. In situ transmission electron microscopy of light-induced photocatalytic reactions. *Nanotech.* 2012;23(7): 075705
14. Kleiman-Shwarscstein, A., **Laursen, A. B.**, Cavalca, F., Tang, W., Dahl, S., & Chorkendorff, I. A general route for RuO₂ deposition on metal oxides from RuO₄. *Chem. Commun.* 2012;48(7):967-969
15. Di Vece, M., **Laursen, A. B.**, Bech, L., Maden, C. N., Duchamp, M., Mateiu, R.V., Dahl, S., & Chorkendorff, I. Quenching of TiO₂ photo catalysis by silver nanoparticles. *J. Photochem. Photobio. A Chem.* 2012;230:10–14
16. **Laursen, A. B.**, Man, I. C., Trinhammer, O. L., Rossmeisl, J., & Dahl, S. The Sabatier Principle Illustrated by Catalytic H₂O₂ Decomposition on Metal Surfaces. *J. Chem. Educ.* 2011;88(12):1711-1715

17. Højholt, K. T., **Laursen, A. B.**, Kegnæs, S., & Christensen, C. H. Size-Selective Oxidation of Aldehydes with Zeolite Encapsulated Gold Nanoparticles. *Top. Catal.* 2011;54(16):1026-1033
18. **Laursen, A. B.**, Højholt, K. T., Lundegaard, L. F., Simonsen, S. B., Helveg, S., Schüth, F., Paul, M., Grunwaldt, J.-D., Kegnæs, S., Christensen, C. H., & Egeblad, K. Substrate size-selective catalysis with zeolite-encapsulated gold nanoparticles. *Angew. Chem. (Int. ED.)* 2010;49(20):3504-3507

Publications (Pending)

19. **Laursen, A. B.**, Vesborg, P. C. K., Sehested, J., Chorkendorff, I. Availability of the elements for catalysis – predicting the potential of novel R&D catalysts, *ACS Catal.* (submitted)
20. **Laursen, A. B.**, Whitaker, M. J., Liu, B., Hwang, S. Rucker, R., Greenblatt, M., Dismukes, G. C., Nickel Phosphides as Hydrogen Evolution Catalysts: A Comparative Study of Structure Correlated Activity and Stability, under preparation
21. **Laursen, A. B.**, Wexler, R. B., Whitaker, M. J., Izett, E., Wang, H., Li, J., Rappe, A. M. Greenblatt, M., Dismukes, G. C. Ni₃P A low Phosphorous content hydrogen evolution electrocatalyst, under preparation

Publications (Not Peer-Reviewed)

22. Hwang, S., Porter, S. H., Gardner, G., **Laursen, A. B.**, Wang, H., Li, M., Amarasinghe, V., Taghaddos, E., Safari, A., Garfunkel, E., Greenblatt, M., Dismukes, G. C. Thin film Catalysts: Ni₅P₄ (Cathodic) and LiCoO₂ (Anodic) for Electrolysis of Water, *ECS Transactions* 2016;72(23):31-51
23. Porter, S. H., Hwang, S., Amarasinghe, V., Taghaddos, E., Manichev, V., Li, M., Gardner, G., **Laursen, A. B.**, Safari, A. Garfunkel, E. Greenblatt, M., Dismukes, G. C. Optimizing “Artificial Leaf” Photoanode-Catalyst Interface Systems for Solar Water Splitting, *ECS Transactions* 2016;72(37):1-19

Teaching Experience

Guest lecturer Rutgers University course# 16:160:471/571 Advanced Inorganic Chemistry Fall 2013 (Graduate level)

Guest lecturer Rutgers University course# 371 Inorganic Chemistry Spring 2015 (Undergraduate level)

Teaching assistant Experimental Surface Science Fall 2009, 2010, & 2011

Mentored 3 undergraduate students, and co-mentoring 2 graduate students

Patent Applications

- Nickel Phosphides Electrocatalysts For Hydrogen Evolution And Oxidation Reactions, filed on December 31, 2013 PCT/US13/78486
- Process for the Preparation of Hybrid Zeolite or Zeolite-like Materials, filed on October 19, 2009, Sold to Haldor Topsøe A/S. Publication number WO2010097108 A1
- Provisional Patent (Appl. No. 62/239,389) Nickel Phosphides As A New Type Of Catalyst For Direct Electrochemical CO₂ Reduction To Hydrocarbons, filed October 9, 2015 US Patent Appl. # 62/239,389
- Nickel Phosphides and Nickel Phosphide: Iron Phosphide As Hydrogen Evolution Electrocatalysts, filed February 1, 2016 US Patent Appl. # 62/289,628