

Prof. Dr. Stefan Ringe

Assistant Professor

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Curriculum Vitae

Personal Details

Nationality Germany.
Place of Birth Buxtehude (Germany).
Date of Birth 02/16/1988.

Education

06/2013–05/2017 **Ph.D. in Computational Chemistry**, *Technical University Munich (Germany)*.
Prof. Dr. Karsten Reuter, “*Summa Cum Laude*” (“*With Highest Honor*”)
10/2010–03/2013 **M.Sc. in Chemistry**, *Georg-August University Göttingen (Germany)*.
Prof. Dr. Alec Wodtke, Final Grade: 1.0 (4.0 on 4 point GPA scale) “*With Honors*”
10/2007–09/2010 **B.Sc. in Chemistry**, *Georg-August University Göttingen (Germany)*.
Prof. Dr. Philipp Vana, Final Grade: 1.3 (3.8 on 4 point GPA scale)

Professional Experience

02/2020–present **Assistant Professor**, *DGIST (Rep. of Korea)*.
Department of Energy Science & Engineering
02/2019–02/2020 **Postdoctoral Research Scholar**, *KAIST (Rep. of Korea)*.
Prof. Dr. Hyungjun Kim
07/2017–01/2019 **Postdoctoral Research Scholar**, *Stanford University (USA)*.
Prof. Dr. Jens Nørskov

Research Interests

- **Computational Design for Sustainable Energy Conversion:** CO₂ reduction, water oxidation (oxygen evolution reaction – OER) and reduction (hydrogen evolution reaction – HER), oxygen reduction reaction (fuel cell), NO reduction. . .

- **Electrified Solid-Liquid Interface Engineering:** Solid-liquid interface electrification and its influence on electrochemical reaction kinetics, via Density Functional Theory (DFT), Implicit Solvation techniques, joint quantum – molecular mechanics approaches (QM/MM)
- **Machine Learning:** Development of *ab initio*-based machine learning – neural network force field for modeling energy conversion at the electrified solid-liquid interface
- **Multi-scale Modeling of Electrochemical Systems:** Mass transport, buffer reactions, electrolyte design, porous electrodes

Awards

- 2019 **Award for Outstanding Oral Presentation**, 130th Physical Chemistry Summer Symposium, Busan, Rep. of Korea.
- 2016 **DAAD scholarship (Kongressreise)**, 67th Annual Meeting of the ISE, The Hague, Netherlands.
- 2014 **Selection for Global Young Scientist Summit**, *National University of Singapore (Singapore)*.
- 2013 **Award for Outstanding Graduation**, *Georg-August University Göttingen (Germany)*, awarded by chemistry department.
- 2012 **Award for Outstanding Teaching**, *Georg-August University Göttingen (Germany)*, awarded by students.
- 2010,2011,2012 **Scholarship of Lower Saxony**.
- 2010 **Otto Wallach Award**, *Georg-August University Göttingen (Germany)*, best B.Sc. degree in chemistry.
- 2007 **GDCh Award**, *Halepaghen-Gymnasium Buxtehude*, best graduation in chemistry (German Society of Chemistry).

Teaching and Mentoring Experience

- 2014–present **Mentoring/Supervision**, *Technical University Munich (Germany)*, Christoph Hille (B.Ed., M.Ed.), Christoph Muschielok, Martin Deimel, Marvin Lechner (all M.Sc).
- 10/2013–
09/2016 **Tutor**, *Technical University Munich (Germany)*,
Mathematics, computational & theoretical chemistry, molecular simulations, numerical methods.
- 10/2008–
03/2013 **Student Tutor**, *Georg-August University Göttingen (Germany)*,
Mathematics, theoretical chemistry, thermodynamics and spectroscopy.

Scientific Achievements

- Invited Talks
- 01/2020 Material Science & Engineering (MSE) department seminar, KAIST (Rep. of Korea)
 - 12/2018 DTU Physics Seminar, Denmark Technical University (DTU) (Denmark)

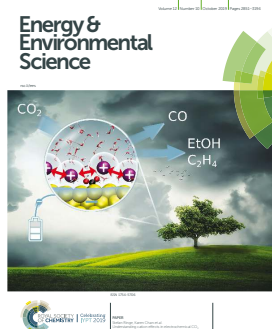
- 07/2018 FHI-aims Developer & User Meeting, Technical University Munich (Germany)
- 03/2018 Seminar of the Department of Chemistry, KAIST (Rep. of Korea)

Referee for *J. Chem. Phys.*

Research Stay • 10/2011–02/2012, *Synthesis of Oxygen-Evolution Catalysts*, Prof. Dr. Åkerman, Stockholm University (Sweden)

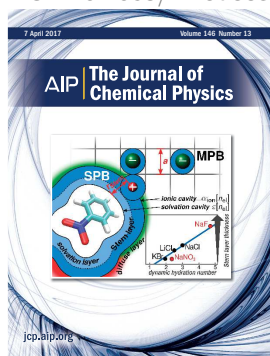
Publications (* = The authors contributed equally to this work.)

- 1 S. Ringe*, C. G. Morales-Guio*, L. D. Chen, M. Fields, T. F. Jaramillo, C. Hahn, K. Chan, *Double layer charging driven carbon dioxide adsorption limits the rate of electrochemical carbon dioxide reduction on Gold*, *Nat. Commun.* **2020**, *11*, 1–11, (corresponding author), DOI: 10.1038/s41467-019-13777-z.
- 2 C. Xia*, S. Back*, S. Ringe*, K. Jiang, F. Chen, X. Sun, S. Siahrostami, K. Chan, H. Wang, *Confined local oxygen gas promotes electrochemical water oxidation to hydrogen peroxide*, *Nature Catalysis* **2020**, DOI: 10.1038/s41929-019-0402-8.
- 3 J. A. Gauthier, C. F. Dickens, H. H. Heenen, S. Vijay, S. Ringe, K. Chan, *Unified Approach to Implicit and Explicit Solvent Simulations of Electrochemical Reaction Energetics*, *J. Chem. Theory Comput.* **2019**, *15*, 6895–6906, DOI: 10.1021/acs.jctc.9b00717.
- 4 J. A. Gauthier, C. F. Dickens, S. Ringe, K. Chan, *Practical Considerations for Continuum Models Applied to Surface Electrochemistry*, *Chemphyschem* **2019**, *20*, 3074–3080, DOI: 10.1002/cphc.201900536.
- 5 S. Ringe*, E. L. Clark*, J. Resasco, A. Walton, B. Seger, A. T. Bell, K. Chan, *Understanding cation effects in electrochemical CO₂ reduction*, *Energy Environ. Sci.* **2019**, *12*, 3001–3014, (corresponding author), inside front cover, Research Highlight in *Nature Catal.*, (DOI: 10.1038/s41929-019-0335-2) and part of the 2019 *Energy Environ. Sci.* HOT Articles, DOI: 10.1039/C9EE01341E.



- 6 Y. Wu*, S. Ringe*, C.-L. Wu, W. Chen, A. Yang, H. Chen, M. Tang, G. Zhou, H. Y. Hwang, K. Chan, Y. Cui, *A Two-Dimensional MoS₂ Catalysis Transistor by Solid-State Ion Gating Manipulation and Adjustment (SIGMA)*, *Nano Lett.* **2019**, *19*, 7293–7300, DOI: 10.1021/acs.nanolett.9b02888.
- 7 E. L. Clark*, S. Ringe*, M. Tang, A. Walton, C. Hahn, T. F. Jaramillo, K. Chan, A. T. Bell, *Influence of Atomic Surface Structure on the Activity of Ag for the Electrochemical Reduction of CO₂ to CO*, *ACS Catal.* **2019**, 4006–4014, DOI: 10.1021/acscatal.9b00260.
- 8 T. Ludwig, J. A. Gauthier, K. S. Brown, S. Ringe, J. K. Nørskov, K. Chan, *Solvent–Adsorbate Interactions and Adsorbate-Specific Solvent Structure in Carbon Dioxide Reduction on a Stepped Cu Surface*, *J. Phys. Chem. C* **2019**, *123*, 5999–6009, DOI: 10.1021/acs.jpcc.8b11571.
- 9 J. A. Gauthier, S. Ringe, C. F. Dickens, A. J. Garza, A. T. Bell, M. Head-Gordon, J. K. Nørskov, K. Chan, *Challenges in Modeling Electrochemical Reaction Energetics with Polarizable Continuum Models*, *ACS Catal.* **2019**, *9*, 920–931, DOI: 10.1021/acscatal.8b02793.
- 10 C. Hille*, S. Ringe*, M. Deimel, C. Kunkel, W. E. Acree, K. Reuter, H. Oberhofer, *Generalized molecular solvation in non-aqueous solutions by a single parameter implicit solvation scheme*, *J. Chem. Phys.* **2019**, *150*, 041710, (corresponding author), DOI: 10.1063/1.5050938.

- 11 X. Liu, P. Schlexer, J. Xiao, Y. Ji, L. Wang, R. B. Sandberg, M. Tang, K. S. Brown, H. Peng, S. Ringe, C. Hahn, T. F. Jaramillo, J. K. Nørskov, K. Chan, *pH effects on the electrochemical reduction of CO₂ towards C₂ products on stepped copper*, *Nat. Commun.* **2019**, 10, 32, DOI: 10.1038/s41467-018-07970-9.
- 12 A. M. Patel, S. Ringe, S. Siahrostami, M. Bajdich, J. K. Nørskov, A. R. Kulkarni, *Theoretical Approaches to Describing the Oxygen Reduction Reaction Activity of Single-Atom Catalysts*, *J. Phys. Chem. C* **2018**, 122, 29307–29318, DOI: 10.1021/acs.jpcc.8b09430.
- 13 S. Ringe, H. Oberhofer, K. Reuter, *Transferable ionic parameters for first-principles Poisson-Boltzmann solvation calculations: Neutral solutes in aqueous monovalent salt solutions*, *J. Chem. Phys.* **2017**, 146, 134103, (corresponding author), front cover, DOI: 10.1063/1.4978850.



- 14 S. Ringe, H. Oberhofer, C. Hille, S. Matera, K. Reuter, *Function-Space-Based Solution Scheme for the Size-Modified Poisson-Boltzmann Equation in Full-Potential DFT*, *J. Chem. Theory Comput.* **2016**, 12, 4052–4066, DOI: 10.1021/acs.jctc.6b00435.