

## Associate Prof. DI Dr. techn. Alexander Karl Opitz

### Personal Data

Date of birth: 8<sup>th</sup> February 1981  
Citizenship: Austrian  
Family status: married, three children  
Office address: TU Wien,  
Institute of Chemical Technologies & Analytics  
Getreidemarkt 9/164-EC  
1060 Wien  
Email address: [alexander.opitz@tuwien.ac.at](mailto:alexander.opitz@tuwien.ac.at)  
Webpage: [electrochem.tuwien.ac.at](http://electrochem.tuwien.ac.at)  
LinkedIn: [@alexander-k-opitz](#)

### Academic Education & Scientific Career

Since Feb. 2022 Associate Prof. at TU Wien, Institute of Chemical Technologies & Analytics  
March 2022 Second ranked in the appointment procedure for the professorship "Electrochemical Energy Conversion" at the Chair of Physical Chemistry, Montanuniversität Leoben.  
19th Jan. 2022 Habilitation (venia docendi) for the subject "Electrochemistry"  
Nov. 2018 – Jan. 2022 Assistant Prof. at TU Wien, Institute of Chemical Technologies & Analytics, Division Electrochemistry  
June – Oct. 2019 Parental leave  
since April 2018 Tenure Track Position at TU Wien  
Oct. 2017 – Jan. 2018 Parental leave.  
Feb. – Sept. 2017 Visiting Scientist at MIT, Department of Nuclear Science and Engineering, Research Group of Prof. Bilge Yildiz.  
since 2014 Head of the Research Group "Electrochemical Energy Conversion" at TU Wien.  
Aug. 2011 – Oct. 2018 University Assistant at TU Wien, Institute of Chemical Technologies & Analytics, Division Electrochemistry.  
May – Sept. 2013 Parental leave.  
June 2011 PhD graduation (with distinction), TU Wien, Supervisor: Prof. Dr. J. Fleig. Title of thesis: „Oxygen Exchange Pathways of Platinum Model Electrodes on Yttria-stabilized Zirconia“.  
Aug. 2008 – Jul. 2011 PhD study at TU Wien, Institute of Chemical Technologies & Analytics, Division Electrochemistry.  
April 2008 Master's degree (Dipl.-Ing.) in Technical Chemistry, TU Wien.

## Project Experience

from 10/2021	Head/PI of the Project “Feeding Plants with Electricity” funded by FWF <i>via</i> the 1000 Ideas program; personnel: 1 PostDoc.
24 <sup>th</sup> June 2021	Certified Project Management Associate IPMA Level D®
since 2017	Key Cooperation Partner of ERC Starting Grant Project “TUCAS” (PI: Dr. Christoph Rameshan). Role of AKO within the project: Supervision of 1 PhD student.
2015 – 2018	Head/PI of the project “Pt/YSZ model electrode systems” funded by Bosch GmbH, Stuttgart; personnel: 1 PhD student.
2014 – 2019	Head/PI of the external module “Electrochemical Properties of Electrode Materials” within the Christian Doppler Laboratory for “Interfaces in Metal-Supported Electrochemical Energy Converters” funded by the Austrian Federal Ministry of Science, Research, and Economy and the National Foundation for Research, Technology, and Development. Project partners: Forschungszentrum Jülich, Plansee SE, AVL List GmbH (associated partners: Kyushu University, Nissan Motor Co., Ltd.); personnel: 1 PostDoc, 1 PhD student, 8 master students.
2011 – 2019	Young Faculty Member within the special research program (SFB) “Functional Oxide Surfaces and Interfaces – FOXSI” funded by FWF.

## Main Research Areas

- Electrochemistry & Solid State Ionics: Study of electrode kinetics, current pathways, and electrochemically active zones of solid state electrochemical systems.
- Solid Oxide Fuel and Electrolysis Cells: Focus on Fuel electrode materials e.g. for CO<sub>2</sub> electrolysis
- Heterogeneous Catalysis: *In-situ* spectroscopic and analytic studies on the surface chemistry and catalytic activity of electrodes.
- Materials Chemistry: Synthesis and characterization of novel, alternative materials for solid oxide cells.

## Scientific Publications and Reviewing Activities

**35 talks** on international conferences and seminars, **15** of those **invited**.

**63 papers** in peer reviewed journals; 13 proceedings papers.

**>1400 total citations; h-index = 21** (Scopus)/**20** (Publons; Web of Science).

ORCID: [0000-0002-2567-1885](https://orcid.org/0000-0002-2567-1885)

Publons (Web of Science ResearcherID): [P-9874-2019](https://publons.com/author/9874-2019/)

Scopus Author ID: [35109496000](https://orcid.org/35109496000)

### **Regular Reviewer for Journals:**

- Journal of Materials Chemistry A
- Journal of Physics: Energy
- Journal of Power Sources
- Solid State Ionics

### **Reviewer of PhD Theses:**

- Massachusetts Institute of Technology (MIT)
- Technical University of Denmark (DTU)

### Five most important papers (in chronological order):

- 1 A.K. Opitz, A. Nenning, C. Rameshan, R. Rameshan, R. Blume, M. Hävecker, A. Knop-Gericke, G. Rupprechter, J. Fleig, B. Klötzer. Enhancing Electrochemical Water-Splitting Kinetics by Polarization-Driven Formation of Near-Surface Iron(0): An In Situ XPS Study on Perovskite-Type Electrodes. *Angewandte Chemie International Edition* **54** (2015), 2628–2632 (<https://doi.org/10.1002/anie.201409527>).
- 2 A.K. Opitz, A. Nenning, C. Rameshan, M. Kubicek, T. Götsch, R. Blume, M. Hävecker, A. Knop-Gericke, G. Rupprechter, B. Klötzer, J. Fleig. Surface Chemistry of Perovskite-Type Electrodes During High Temperature CO<sub>2</sub> Electrolysis Investigated by Operando Photoelectron Spectroscopy. *ACS Applied Materials & Interfaces* **9** (2017), 35847–35860 (<https://doi.org/10.1021/acsami.7b10673>).
- 3 G.M. Rupp, A.K. Opitz, A. Nenning, A. Limbeck, J. Fleig. Real-time impedance monitoring of oxygen reduction during surface modification of thin film cathodes. *Nature Materials* **16** (2017), 640–645 (<https://doi.org/10.1038/nmat4879>).
- 4 D. Udomsilp, J. Rechberger, R. Neubauer, C. Bischof, F. Thaler, W. Schafbauer, N.H. Menzler, L.G.J.d. Haart, A. Nenning, A.K. Opitz, O. Guillon, M. Bram. Metal-Supported Solid Oxide Fuel Cells with Exceptionally High Power Density for Range Extender Systems. *Cell Reports Physical Science* **1** (2020), 100072 (<https://doi.org/10.1016/j.xcrp.2020.100072>).
- 5 A. Nenning, M. Holzmann, J. Fleig, A.K. Opitz. Excellent kinetics of single-phase Gd-doped ceria fuel electrodes in solid oxide cells. *Materials Advances* **2** (2021), 5422 (<https://doi.org/10.1039/d1ma00202c>)

## Teaching Experience and Supervision of Theses

- since 2012 Teaching **lectures and seminars** in curricula Technical Chemistry as well as Chemical and Process Engineering such as “Functional Materials”, “Physical Chemistry for Engineers”, “Electrochemical Processes and Technologies” (head of lecture).
- since 2008 Teaching in **lab courses** in curricula Technical Chemistry as well as Chemical and Process Engineering such as “Physical Chemistry”, “Physical Chemistry for Engineers” (head of lab course), “Materials Technology and Materials Analytics”, “Ceramics & Electrochemistry” (head of lab course).
- 2017-2022 Committee member of the PhD thesis of Jiayue Wang at Massachusetts Institute of Technology, Department of Nuclear Science and Engineering.
- since 2009 (Co-)supervision of 11 master’s and 4 PhD theses; Currently (co)supervising 1 PostDoc, 5 PhD students & 2 master students

## Memberships & Awards

- Austrian Society of Chemistry (GÖCh)
- The Electrochemical Society
- International Society for Solid State Ionics
- American Chemical Society
- American Ceramic Society
- 2015: Best poster, 17th International Conference on Solid State Ionics, Toronto, Canada & 20th International Conference on Solid State Ionics, Keystone, Colorado.
- 2011: Young Scientist’s Award for Applied Electrochemistry; awarded by GDCh.