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| 若い男性の顔  自動的に生成された説明**大岡 英史**  **理化学研究所 環境資源科学研究センター　（CSRS）**  **生体機能触媒研究チーム　研究員** |

学歴

|  |  |
| --- | --- |
| 2009.04 – 2013.03 | 東京大学 工学部 応用化学科 卒業（学士） |
| 2013.04 – 2015.03 | 東京大学 工学系研究科 応用化学専攻 修了（修士） |
| 2015.03 – 2018.03 | 東京大学 工学系研究科 応用化学専攻 修了（博士） |

職歴と研究内容：

|  |  |
| --- | --- |
| 2018.04 – 2019.03 | 理化学研究所 特別研究員  「普遍金属元素による酸素発生触媒に関する研究」 |
| 2019.04 – 2020.09 | 理化学研究所 基礎科学特別研究員（JSPS SPD辞退）  「In-situ分光による触媒反応機構の解明」 |
| 2020.10 – 現職 | 理化学研究所 研究員（定年制）  「非平衡触媒反応理論の開拓」 |

受賞歴

CSJ化学フェスタ ポスター賞

DC1 採用

MERIT賞 (学年40人から優秀者4人)

工学系研究科長賞(専攻内で最優秀賞)

SPD面接辞退

基礎科学特別研究員 採用

桜舞賞

基礎科学特別研究員 成果報告会 優秀賞

**査読付き論文**

PUBLICATIONS

**特許**

# Heading

# Publications

# Presentations

# Patents

# Press

# Funding

# Awards

# Publications

1. **Hideshi Ooka**\*, Yoko Chiba, Ryuhei Nakamura "Universal Design Principle to Enhance Enzymatic Activity Using the Substrate Affinity", *bioRxiv*, **2023**, 10.1101/2023.02.01.526728, (*under review at Nat. Commun.*).

2. **Hideshi Ooka**\*, Marie E Wintzer, Hirokazu Komatsu, Kiyohiro Adachi, Ailong Li, Shuang Kong, Daisuke Hashizume, Atsushi Mochizuki, Ryuhei Nakamura\* "Dissipation Lifetime of Catalysis as a Dynamical System", *ChemRxiv*, **2023**, 10.26434/chemrxiv-2023-7w3gk, (*submitted to Phys. Rev. Lett.*).

3. Koichi Yatsuzuka, Kiyohiro Adachi, Daisuke Hashizume, Ryuhei Nakamura\*, **Hideshi Ooka**\* "A Non-Rate-Determining Redox Process Dictates the Oxygen Evolution Tafel Slope of MnO2", *ChemRxiv*, **2023**, 10.26434/chemrxiv-2023-lkdf3, (*submitted to J. Phys. Chem. C*).

4. Yoko Chiba\*, **Hideshi Ooka**\*, Marie Wintzer, Nao Tsunematsu, Takehiro Suzuki, Naoshi Dohmae, Ryuhei Nakamura "Diverse Phosphoserine Phosphatases Exhibit Maximum Activity at an Intermediate Binding Affinity in Accord With the Sabatier Principle of Catalysis", *bioRxiv*, **2023**, 10.1101/2023.03.10.532031, (*submitted to Angew. Chem. Int. Ed.*).

5. Daoping He\*, **Hideshi Ooka**, Yamei Li, Yujeong Kim, Akira Yamaguchi, Kiyohiro Adachi, Daisuke Hashizume, Naohiro Yoshida, Sakae Toyoda, Sun Hee Kim, Ryuhei Nakamura\* "Regulation of the Electrocatalytic Nitrogen Cycle Based on Sequential Proton-Electron Transfer", *Nat. Catal.*, **2022**, 798-806.

6. Ailong Li, Shuang Kong, Chenxi Guo, **Hideshi Ooka**, Kiyohiro Adachi, Daisuke Hashizume, Qike Jiang, Hongxian Han, Jianping Xiao\*, Ryuhei Nakamura\* "Enhancing the Stability of Cobalt Spinel Oxide Towards Sustainable Oxygen Evolution in Acid", *Nat. Catal.*, **2022**, 109-118.

7. **Hideshi Ooka**\*, Jun Huang, Kai S Exner "The Sabatier Principle in Electrocatalysis: Basics, Limitations, and Extensions", *Front. Energ. Res.*, **2021**, 155.

8. Thomas Kadyk\*, Jianping Xiao, **Hideshi Ooka**, Jun Huang, Kai S Exner\* "Material and Composition Screening Approaches in Electrocatalysis and Battery Research", *Front. Energ. Res.*, **2021**, 227.

9. **Hideshi Ooka**\*, Marie E Wintzer, Ryuhei Nakamura "Non-Zero Binding Enhances Kinetics of Catalysis: Machine Learning Analysis on the Experimental Hydrogen Binding Energy of Platinum", *ACS Catal.*, **2021**, 6298-6303.

10. Ji-Eun Lee, Akira Yamaguchi, **Hideshi Ooka**, Tomohiro Kazami, Masahiro Miyauchi, Norio Kitadai, Ryuhei Nakamura\* "In Situ FTIR Study of CO2 Reduction on Inorganic Analogues of Carbon Monoxide Dehydrogenase", *Chem. Commun.*, **2021**, 3267-3270.

11. Daoping He, **Hideshi Ooka**, Yujeong Kim, Yamei Li, Fangming Jin\*, Sun Hee Kim\*, Ryuhei Nakamura\* "Atomic-Scale Evidence for Highly Selective Electrocatalytic N- N Coupling on Metallic MoS2", *Proc. Natl. Acad. Sci.*, **2020**, 31631-31638.

12. Yamei Li\*, Yoo Kyung Go, **Hideshi Ooka**, Daoping He, Fangming Jin, Sun Hee Kim\*, Ryuhei Nakamura\* "Enzyme Mimetic Active Intermediates for Nitrate Reduction in Neutral Aqueous Media", *Angew. Chem. Int. Ed.*, **2020**, 9744-9750.

13. **Hideshi Ooka**\*, Ryuhei Nakamura "Shift of the Optimum Binding Energy at Higher Rates of Catalysis", *J. Phys. Chem. Lett.*, **2019**, 6706-6713.

14. Ailong Li, **Hideshi Ooka**, Nad{\`e}ge Bonnet, Toru Hayashi, Yimeng Sun, Qike Jiang, Can Li, Hongxian Han\*, Ryuhei Nakamura\* "Stable Potential Windows for Long-Term Electrocatalysis by Manganese Oxides Under Acidic Conditions", *Angew. Chem. Int. Ed.*, **2019**, 5108-5112.

15. Daoping He, **Hideshi Ooka**, Yamei Li, Fangming Jin\*, Ryuhei Nakamura\* "Phase-Selective Hydrothermal Synthesis of Metallic MoS2 at High Temperature", *Chem. Lett.*, **2019**, 5054-5058.

16. **Hideshi Ooka**, Shawn E McGlynn, Ryuhei Nakamura\* "Electrochemistry at Deep-Sea Hydrothermal Vents: Utilization of the Thermodynamic Driving Force Towards the Autotrophic Origin of Life", *ChemElectroChem*, **2019**, 1316-1323.

17. **Hideshi Ooka**, Kazuhito Hashimoto, Ryuhei Nakamura\* "Design Strategy of Multi-Electron Transfer Catalysts Based on a Bioinformatic Analysis of Oxygen Evolution and Reduction Enzymes", *Mol. Inform.*, **2018**, 1700139.

18. Hirotaka Kakizaki, **Hideshi Ooka**, Toru Hayashi, Akira Yamaguchi, Nad{\`e}ge Bonnet-Mercier, Kazuhito Hashimoto, Ryuhei Nakamura\* "Evidence That Crystal Facet Orientation Dictates Oxygen Evolution Intermediates on Rutile Manganese Oxide", *Adv. Funct. Mater.*, **2018**, 1706319.

19. Daoping He, Yamei Li, **Hideshi Ooka**, Yoo Kyung Go, Fangming Jin\*, Sun Hee Kim\*, Ryuhei Nakamura\* "Selective Electrocatalytic Reduction of Nitrite to Dinitrogen Based on Decoupled Proton-Electron Transfer", *J. Am. Chem. Soc.*, **2018**, 2012-2015.

20. **Hideshi Ooka**, Marta C Figueiredo, Marc TM Koper\* "Competition Between Hydrogen Evolution and Carbon Dioxide Reduction on Copper Electrodes in Mildly Acidic Media", *Langmuir*, **2017**, 9307-9313.

21. **Hideshi Ooka**, Toshihiro Takashima, Akira Yamaguchi, Toru Hayashi, Ryuhei Nakamura\* "Element Strategy of Oxygen Evolution Electrocatalysis Based on in Situ Spectroelectrochemistry", *Chem. Commun.*, **2017**, 7149-7161.

22. **Hideshi Ooka**, Akira Yamaguchi, Toshihiro Takashima, Kazuhito Hashimoto, Ryuhei Nakamura\* "Efficiency of Oxygen Evolution on Iridium Oxide Determined From the pH Dependence of Charge Accumulation", *J. Phys. Chem. C*, **2017**, 17873-17881.

23. **Hideshi Ooka**, Yuanqing Wang, Akira Yamaguchi, Makoto Hatakeyama, Shinichiro Nakamura, Kazuhito Hashimoto\*, Ryuhei Nakamura\* "Legitimate Intermediates of Oxygen Evolution on Iridium Oxide Revealed by in Situ Electrochemical Evanescent Wave Spectroscopy", *Phys. Chem. Chem. Phys.*, **2016**, 15199-15204.

24. **Hideshi Ooka**, Takumi Ishii, Kazuhito Hashimoto\*, Ryuhei Nakamura\* "Light-Induced Cell Aggregation of Euglena Gracilis Towards Economically Feasible Biofuel Production", *RSC Adv.*, **2014**, 20693-20698.

# Funding

**1. JSPS Kakenhi (Early Career) (Principal Investigator)**Title：Introducing Low Spin Electron Configuration to Enhance the Activity of 3d-Block Oxygen Evolution Catalysts  
Period：202004 - 202203  
Amount：4,160,000円

**2. JST FOREST Program (Principal Investigator)**Title：Theory of Non-equilibrium Catalytic Reaction Networks  
Period：202204 - 202903  
Amount：50,000,000円

**3. JSPS Kakenhi (Early Career) (Principal Investigator)**Title：Predicting the Activity of Oxygen Evolution Electrocatalysts using Microkintics and Machine Learning  
Period：202204 - 202403  
Amount：4680000円

**4. JSPS Kakenhi (Transformative A) (Co-Investigator)**Title：Chemistry: Demonstration of Prebiotic Metabolism in a CO-Rich Environment  
Period：202204 - 202703  
Amount：252,810,000円

**5. JSPS Kakenhi (A) (Co-Investigator)**Title：Regulation of Catalytic Reaction Networks  
Period：202204 - 202503  
Amount：30,350,000円

**6. RIKEN Incentive Research Project (Principal Investigator)**Title：Study on the Charge Accumulation Process Towards the Rational Development of Earth-Abundant Oxygen Evolution Catalysts  
Period：201804 - 202003  
Amount：???円

**7. RIKEN and Tohoku University nan (Principal Investigator)**Title：Using Highthroughput DFT Calculations for Element Strategy of Catalysis  
Period：202204 - 202303  
Amount：1,730,000円

# Awards

2013XXXX,CSJ Chemistry Festa Poster Prize,Chemical Society of Japan (CSJ)

20150401,JSPS DC1 (no interview),Japan Society for the Promotion of Science (JSPS)

20180307,Merit Award (4 awardees out of 40 candidates),University of Tokyo Leading Graduate Program MERIT

201803XX,Cum Laude,University of Tokyo Department of Engineering

2019XXXX,SPD Interview Declined,Japan Society for the Promotion of Science (JSPS)

20190401,Special Postdoctoral Researcher,RIKEN

201903,nan,nan

202003,nan,nan