燃料電池 20巻1号 令和2年 7月30日発行 令和2年 7月25日印刷 ISSN 1346-6623

Summer 2020

# Vol.20 No.1

夏

The Journal of Fuel Cell Technology

巻頭言 水素社会の実現に向けて

特集燃料電池の様々な用途開発

基礎講座 燃料電池の電極反応速度に対する物質移動の影響

特別企画 50 年後の燃料電池を考える

投稿論文 プロトン伝導体/酸化物イオン伝導体形水蒸気電解

による水素製造システムの効率検討



## The Journal of Fuel Cell Technology

#### **Contents**

F	or	e	W	٥r	ď
	VI.	v		VI	v.

- **■** Toward the Realization of Hydrogen Society
  - Y. Furukawa Director General, Advanced Battery and Hydrogen Technology Division,
    - New Energy and Industrial Technology Development Organization · · · · · 1

#### Special Issue

**Various Application Development of Fuel Cells** 

- A New Grid Architecture : Cell Grid and the Role of Fuel Cell Generation
  - R. Abe Representative Director Digital Grid Consortium · · · · · 7
- Fuel Cell for Base Transceiver Station (BTS) at NTT DOCOMO
  - K. Takeno Environmental Technology Research Group, Research Laboratories, NTT DOCOMO, INC. .....12
- **■** Fundamentals and Applications of Microbial Fuel Cells
  - S. Yamada, K. Watanabe School of Life Sciences, Tokyo University of Pharmacy and Life Sciences .....17
- Development of SOFC Drone for Long-term Operation
  - H. Sumi Innovative Functional Materials Research Institute,
  - National Institute of Advanced Industrial Science and Technology (AIST)
    - S. Nakabayashi, Y. Uchiyama Atsumitec Co., Ltd.
      - K. Ichihara Prodrone Co., Ltd. · · · · · 23

#### Fuel Cells in 2070

- Outlook for the Future of Methanol and Fuel Cell
  - M. Taniguchi Senior Research Manager, Niigata Research Laboratory,
    - Mitsubishi Gas Chemical Company, Inc. .....28

- **■** Biological Fuel Cells
  - K. Kano Division of Applied Life Science, Graduate School of Agriculture, Professor .....34
- Electrocatalytic Reaction and Mechanism Using Fuel Cell Reactor for Development of Efficient Chemical Process
  - I. Yamanaka Tokyo Institute of Technology, School of Materials and Chemical Technology .....40

### Vol.20 No.1 Summer 2020

Award
■ Tanaka Kikinzoku Kogyo's Contribution to the Industry in the Field of Fuel Cell Catalysts
K. Matsutani – Fuel Cell Catalyst Development Center, Tanaka Kikinzoku Kogyo K.K46
■ Development of Fuel Cell Electrocatalysts Based on Surface Atomic Structural Control
by Dry Process Methods  N. Todoroki - Graduate School of Environmental Studies, Tohoku University50
■ Molecular Dynamics Study of Ionomer Thin Film Structures in Catalyst Layers
T. Mabuchi – Frontier Research Institute of Interdisciplinary Sciences,
Institute of Fluid Science, Tohoku University
T. Tokumasu – Institute of Fluid Science, Tohoku University ·····57
Basics
S. Sugawara - Project Manager, Electrocatalysis, Fuel Cell Cutting-Edge
Research Center Technology Research Association (FC-Cubic TRA) ······62
Column
■ Fuel Cells and Me No.33
S. C. Singhal – Pacific Northwest National Laboratory ······70
Report
■ Report on 27 <sup>th</sup> Fuel Cell Symposium
Fuel Cell Development Information Center (FCDIC) ······73
Paper
■ Efficiency Evaluation of Hydrogen Production Systems with Proton/ Oxide-ion Conducting Solid
Oxide Electrolysis Cells by Calculation
K. Li - Graduate School of Engineering, Yokohama National University
T. Araki - Faculty of Engineering, Yokohama National University
M. Mori – Materials Science Research Laboratory, Central Research Institute of Electric Power Industry76
Book Review
M. Yoshitake - Fuel Cell Development Information Center (FCDIC) ······84
Information Fuel Cell Development Information Center (FCDIC) ······88
Postscript  H. Itsuki – Editional Committee Member ·····95