

2017年度（平成29年度）

研究部門名 化学研究部門

講座名 基盤物質化学講座

教員名 泉 康雄

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(1) 研究論文などのリスト (印刷中を含む)

	著者・発表者等	タイトル	発表雑誌・会 合等	巻・ 号	頁	発 行・発 表年 等	掲載論文 の DOI (付 与されて いる場 合)
(1)	<u>Shogo Kawamura</u> , <u>Hongwei Zhang</u> , Masayuki Tamba, Takashi Kojima, <u>Masaya Miyano</u> , <u>Yusuke Yoshida</u> , <u>Mao Yoshiba</u> , and <u>Yasuo Izumi</u>	Efficient Volcano-type Dependence of Photocatalytic CO <sub>2</sub> Conversion into Methane Using Hydrogen at Reaction Pressures up to 0.80 MPa	<i>Journal of Catalysis</i>	345	39-52	2017	10.1016/j.jcat.2016.10.024
(2)	<u>Masaya Miyano</u> , <u>Hongwei Zhang</u> , <u>Mao Yoshiba</u> , and <u>Yasuo Izumi</u>	Selective Photoconversion of Carbon Dioxide into Methanol Using Layered Double Hydroxides at the Reaction Pressure of 0.40 MPa	<i>Energy Technology</i>	5(6)	892-900	2017	10.1002/ente.201600578
(3)	<u>Masaya Miyano</u> , <u>Hongwei Zhang</u> , <u>Mao Yoshiba</u> , and <u>Yasuo Izumi</u>	Selective Photoconversion of Carbon Dioxide into Methanol Using Layered Double Hydroxides at the Reaction Pressure of 0.40 MPa (Cover page)	<i>Energy Technology</i>	5(6)	770	2017	10.1002/ente.201700288
(4)	<u>Hongwei Zhang</u> , <u>Shogo Kawamura</u> , Masayuki Tamba, Takashi Kojima, <u>Mao Yoshiba</u> , and <u>Yasuo Izumi</u>	Is water more reactive than H <sub>2</sub> in photocatalytic CO <sub>2</sub> conversion into fuels using semiconductor catalysts under reaction Pressures up to 0.80 MPa?	<i>Journal of Catalysis</i>	352	452-465	2017	10.1016/j.jcat.2017.06.016
(5)	<u>Mao Yoshiba</u> , <u>Yuta Ogura</u> , Masayuki Tamba, Takashi Kojima, and <u>Yasuo Izumi</u>	Solar cell for maximizing voltage up to the level difference of two photocatalysts: optimization and clarification of electron pathway	<i>RSC Advances</i>	7(32)	19996 - 20006	2017	10.1039/C7RA02600E
(6)	<u>Lukas Anton Wein</u> , <u>Hongwei Zhang</u> , <u>Kazuki Urushidate</u> , <u>Masaya Miyano</u> , and <u>Yasuo Izumi</u>	Optimized photoreduction of CO <sub>2</sub> exclusively into methanol utilizing liberated reaction space in layered double hydroxides comprising zinc, copper, and gallium	<i>Applied Surface Science</i>	印刷中	印刷中	2017	未定
(7)	<u>Hongwei Zhang</u> and <u>Yasuo Izumi</u>	Behavior of Oxygen During Photocatalytic CO <sub>2</sub> Conversion into Fuels Using Pd/TiO <sub>2</sub>	<i>Photon Factory Activity Report 2016</i>	34	2014G631	2017	

(8)	<u>Yusuke Yoshida</u> and <u>Yasuo Izumi</u>	EXAFS Characterization of an Interface Model Nanocatalyst: Binary metal (Ti, Cu) Oxyhydroxy-Organic Framework	<i>Factory Activity Report 2016</i>	34	2015G 586	2017	
(9)	<u>Masaya Miyano</u> , <u>Hongwei Zhang</u> , and <u>Yasuo Izumi</u>	Demonstration of In Situ High-Pressure Photocatalytic Cell for XAFS Measurements	<i>Photon Factory Activity Report 2016</i>	34	2016G 577	2017	

## (2) 卒業研究、大学院修士および博士論文修了指導人数

- ・卒業研究           3名
- ・大学院修士        2名
- ・大学院博士        0名

## (3) 教育業績（自己申告、テキストの作成など、授業の工夫など）

必修の専門講義では、ウェブ（シラバス、moodle）や配布物を通じて講義の目的や必要となる原理を学生が自然に身につけられるように心がけた。ウェブおよび宿題（レポート）を通じて、インタラクティブな講義とした。最新の研究アイデアや手法の創造性についての討議（発表およびレビュー）を学生主体で行うことにより、学生らが研究アイデアを生み出す動機付けとした。また実験科目を通じて、学生が専門課程の研究者になることを常に想定して、必要になる思考法やデータのまとめ方についても伝授するよう心がけた。他学科の学生向けおよび他学科の学生も含む講義では、化学の基礎を実験を通して学び、研究の面白さを紹介することを優先して講義を行った。

英語による講義もオムニバス形式であったが、実施し、特に日本語を母国語としない学生に有益と感じた。

## (4) 国際会議出席と招待リスト

(a) *253rd ACS National Meeting & Exposition*, San Francisco, USA, CATL103, April 2-6 (Presentation April 3), 2017,

“Why is water more reactive than H<sub>2</sub> in photocatalytic CO<sub>2</sub> conversion into fuels at reaction pressure up to 0.80 MPa?” ,

Hongwei Zhang, Shogo Kawamura, Masaya Miyano, Mao Yoshida, Yasuo Izumi

(b) *2nd International Workshop Advances on Photocatalysis (AdvPhotoCat-E 2017)*, p.7, Heraklion, Greece, July 14-16 (Presentation July 16), 2017,

“Photocatalytic challenge of carbon dioxide conversion into fuels supported by spectroscopy” ,

Hongwei Zhang, Masaya Miyano, Shogo Kawamura, Magda C. Puscasu, Gabriela Carja, and Yasuo Izumi, 招待講演

(c) *IUMRS-ICAM 2017 (15<sup>th</sup> International Conference on Advanced Materials)*, Kyoto, August 27-September 1 (Presentation August 28), 2017,

“Solar Cell for Maximizing Voltage up to the Band Gap: Optimization and Clarification of

Electron Pathway”

Mao Yoshiba, Yuta Ogura, Masayuki Tamba, Takashi Kojima, and Yasuo Izumi, 招待講演

(d) *Research Methods for Advanced Environmental Catalysis*, Wuhan University, China, November 17, 21, 2017.

“Introduction to the principle of XAFS and EXAFS and their applications to characterization of catalysts” and “Activation of CO<sub>2</sub>”,

Yasuo Izumi, 招待講演

(e) *Open Lecture at Key Laboratory of Material Chemistry for Energy Conversion and Storage*, Huazhong University of Science and Technology, China, November 20, 2017,

“A solar cell for use of acidic water enabling open-circuit voltage of 2 V”,

Yasuo Izumi, 招待講演

#### H31.4.2 追記

(f) International Symposium on Novel Energy Nanomaterials, Catalysts and Surfaces for Future Earth - Material Research, Characterization and Imaging by In situ/Operando XAFS and X-ray Techniques-, Tokyo, Japan, October 28-30 (Presentation October 30), 2017, “Monitoring of Active Site Structure of Pd/TiO<sub>2</sub> Photocatalyst Under the Reaction Conditions of CO<sub>2</sub> Photoconversion into Fuels”, Hongwei Zhang, Shogo Kawamura, and Yasuo Izumi, 0-61.

(5) 新聞や雑誌等で報道された研究成果等（報道媒体，報道年月日，報道内容等）

(6) 国際並びに国内学会での受賞（賞名，その内容，受賞理由等）

(7) 国際共同研究（共同研究名，研究内容等）

所属	職名	氏名	共同研究名	研究内容	年度
Technical University “Gh. Asachi” of Iași	教授	Gabriela Carja	次世代環境調和触媒の研究	次世代環境調和触媒としてCO <sub>2</sub> 光燃料化の研究を継続した。	29

(8) 地域・社会と連携した教育・研究活動，学会、国、県などへの協力，など

(a) 2009.6～ 触媒学会 燃料電池関連触媒 世話人

(b) 2016.12.1～2017.11.30 科学研究費委員会専門委員

(c) 2017年4月25日、千葉大学図書館、1210 あかりんアワー、千葉市「二酸化炭素の光燃料化と光燃料電池の研究」

(d) 2017.4～2018.3 日本化学会代議員

(e) 2017.7 *2nd International Workshop Advances on Photocatalysis (AdvPhotoCat-E 2017)*,

International Scientific Committee

- (f) 2017.8~2017.9 CONCERT-Japan (Connecting and Coordinating European Research and Technology Development with Japan project) 「効果的なエネルギー貯蔵と配分 (Efficient Energy Storage and Distribution) 」 分野課題審査員
- (g) 2017.11~2018.1 Research proposal reviewer, FWF Austrian Science Fund

#### 審査した論文誌

(1) *Journal of the American Chemical Society*, (2) *Journal of the Brazilian Chemical Society*, (3) *Angewandte Chemie*, (4) *Chemistry - A European Journal*, (5) *Chemical Communications*, (6) *New Journal of Chemistry*, (7) *Chemistry Open*, (8) *Chemistry Letters*, (9) *Bulletin of Chemical Society of Japan*, (10) *International Journal of Molecular Sciences*, (11) *Journal of Physical Chemistry C (Journal of Physical Chemistry, Journal of Physical Chemistry B)*, (12) *Physical Chemistry Chemical Physics*, (13) *Analytical Chemistry*, (14) *Inorganic Chemistry*, (15) *Coordination Chemistry Reviews*, (16) *Chemistry of Materials*, (17) *Journal of Materials Chemistry (Journal of Materials Chemistry A)*, (18) *Advanced Materials*, (19) *Journal of Materials Science*, (20) *Materials Letters*, (21) *Materials Chemistry and Physics*, (22) *Journal of Solid State Chemistry*, (23) *Solid State Sciences*, (24) *Microporous and Mesoporous Materials*, (25) *Dyes and Pigments*, (26) *Journal of Alloys and Compounds*, (27) *Journal of Nanoscience and Nanotechnology*, (28) *Materials (MDPI)*, (29) *Polymer*, (30) *Langmuir*, (31) *ACS Applied Materials and Interfaces*, (32) *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, (33) *Applied Surface Science*, (34) *e-Journal of Surface Science and Nanotechnology*, (35) *Thin Solid Films*, (36) *ACS Catalysis*, (37) *Catalysis Science & Technology*, (38) *Journal of Catalysis*, (39) *Applied Catalysis A: General*, (40) *Applied Catalysis B: Environmental*, (41) *Journal of Molecular Catalysis A: Chemical*, (42) *Catalysis Letters*, (43) *Catalysis Today*, (44) *Topics in Catalysis*, (45) *Catalysis Communications*, (46) *Current Catalysis*, (47) *Journal of Photochemistry and Photobiology A: Chemistry*, (48) *Environmental Science and Technology*, (49) *Chemosphere*, (50) *Journal of Air & Waste Management Association*, (51) *Journal of Hazardous Materials*, (52) *Journal of Cleaner Production*, (53) *International Journal of Hydrogen Energy*, (54) *Nano Energy*, (55) *Fuel*, (56) *Joule*, (57) *Journal of Environmental Chemical Engineering*, (58) *ACS Sustainable Chemistry and Engineering*, (59) *Chemical Engineering Journal*, (60) *Industrial and Engineering Chemistry Research*, (61) *Journal of Industrial and Engineering Chemistry*, (62) *Korean Journal of Chemical Engineering*, (63) *Journal of the Taiwan Institute of Chemical Engineers*, (64) *International Journal of Thermal Sciences*, (65) *Chemical Physics Letters*

(9) 特許 (発明者名, 発明の名称, 出願日, 出願番号, 整理番号等) (現時点で公表できるもののみ)  
なし

(10) その他  
なし