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[研究テーマ・キーワード]

無機層状化合物，光エネルギー変換，(オキシ)ナイトライド，水分解光触媒，ナノ構造材料の開発及びその応用

[査読付き原著論文]

(2005)

1. Junya Sato, Nobuo Saito, Yoko Yamada, **Kazuhiko Maeda**, Tsuyoshi Takata, Junko N. Kondo, Michikazu Hara, Hisayoshi Kobayashi, Kazunari Domen, Yasunobu Inoue, "RuO_2-Loaded β-Ge_3N_4 as a Non-Oxide Photocatalyst for Overall Water Splitting" *Journal of the American Chemical Society (Communications),* **2005**, *127* (12), 4150–4151. DOI: 10.1021/ja042973v.

2. **Kazuhiko Maeda**, Tsuyoshi Takata, Michikazu Hara, Nobuo Saito, Yasunobu Inoue, Hisayoshi Kobayashi, Kazunari Domen, "GaN:ZnO Solid Solution as a Photocatalyst for Visible-Light-Driven Overall Water Splitting" *Journal of the American Chemical Society (Communications),* **2005**, *127* (23), 8286–8287. DOI: 10.1021/ja0518777.

3. **Kazuhiko Maeda**, Kentaro Teramura, Tsuyoshi Takata, Michikazu Hara, Nobuo Saito, Kenji Toda, Yasunobu Inoue, Hisayoshi Kobayashi, Kazunari Domen, "Overall Water Splitting on $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Solid Solution Photocatalyst: Relationship between Physical Properties and Photocatalytic Activity" *The Journal of Physical Chemistry B,* **2005**, *109* (43), 20504–20510. DOI: 10.1021/jp053499y.

4. Kentaro Teramura, **Kazuhiko Maeda**, Takafumi Saito, Tsuyoshi Takata, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Characterization of Ruthenium Oxide Nanocluster as a Cocatalyst with $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ for Photocatalytic Overall Water Splitting" *The Journal of Physical Chemistry B,* **2005**, *109* (46), 21915–21921. DOI: 10.1021/jp054313y.

5. Masatomo Yashima, **Kazuhiko Maeda**, Kentaro Teramura, Tsuyoshi Takata, Kazunari Domen, "Crystal Structure and Optical Properties of $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Oxynitride Photocatalyst (x = 0.13)" *Chemical Physics Letters,* **2005**, *416* (4–6), 225–228. DOI: 10.1016/j.cplett.2005.09.092.

(2006)

6. Masatomo Yashima, **Kazuhiko Maeda**, Kentaro Teramura, Tsuyoshi Takata, Kazunari Domen, "Crystal Structure Analysis of $(Ga_{0.93}Zn_{0.07})(N_{0.90}O_{0.10})$ Oxynitride Photocatalyst" *Material Transactions,* **2006**, *47* (2), 295–297.

7. **Kazuhiko Maeda**, Kentaro Teramura, Daling Lu, Tsuyoshi Takata, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Photocatalyst Releasing Hydrogen from Water - Enhancing Catalytic Performance Holds Promise for Hydrogen Production by Water Splitting in Sunlight" *Nature (Brief Communications),* **2006**, *440* (7082), 295. DOI: 10.1038/440295a.

8. **Kazuhiko Maeda**, Kentaro Teramura, Hideaki Masuda, Tsuyoshi Takata, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Efficient Overall Water Splitting under Visible Light

Irradiation on $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Dispersed with Rh–Cr Mixed-Oxide Nanoparticles: Effect of Reaction Conditions on the Photocatalytic Activity" *The Journal of Physical Chemistry B,* **2006**, *110* (26), 13107–13112. DOI: 10.1021/jp0616563.

9. **Kazuhiko Maeda**, Kentaro Teramura, Daling Lu, Tsuyoshi Takata, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Characterization of Rh–Cr Mixed-Oxide Nanoparticles Dispersed on $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ as a Cocatalyst for Visible-Light-Driven Overall Water Splitting" *The Journal of Physical Chemistry B,* **2006**, *110* (28), 13753–13758. DOI: 10.1021/jp061829o.

10. **Kazuhiko Maeda**, Kentaro Teramura, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Improvement of Photocatalytic Activity of $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Solid Solution for Overall Water Splitting by Co-Loading Cr and another Transition Metal" *Journal of Catalysis,* **2006**, *243* (2), 303–308. DOI: 10.1016/j.jcat.2006.07.023.

11. **Kazuhiko Maeda**, Kentaro Teramura, Daling Lu, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Noble-Metal/Cr_2O_3 Core/Shell Nanoparticle as a Cocatalyst for Photocatalytic Overall Water Splitting" *Angewandte Chemie International Edition,* **2006**, *45* (46), 7806–7809. DOI: 10.1002/anie.200602473.

(2007)

12. **Kazuhiko Maeda**, Kentaro Teramura, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Photocatalytic Overall Water Splitting on Gallium Nitride Powder" *Bulletin of the Chemical Society of Japan,* **2007**, *80* (5), 1004–1010. DOI: 10.1246/bcsj.80.1004. ***Selected Paper***.

13. **Kazuhiko Maeda**, Nobuo Saito, Daling Lu, Yasunobu Inoue, Kazunari Domen, "Photocatalytic Properties of RuO_2-Loaded β-Ge_3N_4 for Overall Water Splitting" *The Journal of Physical Chemistry C,* **2007**, *111* (12), 4749–4755. DOI: 10.1021/jp067254c.

14. **Kazuhiko Maeda**, Kentaro Teramura, Daling Lu, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Roles of Rh/Cr_2O_3 (Core/Shell) Nanoparticles Photodeposited on Visible-Light-Responsive $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Solid Solutions in Photocatalytic Overall Water Splitting" *The Journal of Physical Chemistry C*, **2007**, *111* (20), 7554–7560. DOI: 10.1021/jp071056j.

15. Xiaojun Sun, **Kazuhiko Maeda**, Maël Le Faucheur, Kentaro Teramura, Kazunari Domen, "Preparation of $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ solid solution from $ZnGa_2O_4$ and ZnO as a photocatalyst for overall water splitting under visible light" *Applied Catalysis A: General*, **2007**, *327* (1), 114–121. DOI: 10.1016/j.apcata.2007.05.005.

16. **Kazuhiko Maeda**, Nobuo Saito, Yasunobu Inoue, Kazunari Domen, "Dependence of

Activity and Stability of Germanium Nitride Powder for Photocatalytic Overall Water Splitting on Structural Properties" *Chemistry of Materials*, **2007**, *19* (16), 4092–4097. DOI: 10.1021/cm0709828.

17. **Kazuhiko Maeda**, Yoshiki Shimodaira, Byongjin Lee, Kentaro Teramura, Daling Lu, Hisayoshi Kobayashi, Kazunari Domen, "Studies on $TiN_xO_yF_z$ as a Visible-Light-Responsive Photocatalyst" *The Journal of Physical Chemistry C,* **2007**, *111* (49), 18264–18270. DOI: 10.1021/jp0765188.

18. Takeshi Hirai, **Kazuhiko Maeda**, Masaaki Yoshida, Jun Kubota, Shigeru Ikeda, Michio Matsumura, Kazunari Domen, "Origin of Visible Light Absorption in GaN-Rich $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Photocatalysts" *The Journal of Physical Chemistry C (Letters)*, **2007**, *111* (51), 18853–18855. DOI: 10.1021/jp709811k.

(2008)

19. **Kazuhiko Maeda**, Kentaro Teramura, Kazunari Domen, "Effect of Post-Calcination on Photocatalytic Activity of $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Solid Solution for Overall Water Splitting under Visible Light" *Journal of Catalysis*, **2008**, *254* (2), 198–204. DOI: 10.1016/j.jcat.2007.12.009.

20. **Kazuhiko Maeda**, Hiroshi Hashiguchi, Hideaki Masuda, Ryu Abe, Kazunari Domen, "Photocatalytic Activity of $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Solid Solution for Visible-Light-Driven H_2 and O_2 Evolution in the Presence of Sacrificial Reagents" *The Journal of Physical Chemistry C*, **2008**, *112* (9), 3447–3452. DOI: 10.1021/jp710758q.

21. Xinchen Wang, **Kazuhiko Maeda**, Yungi Lee, Kazunari Domen, "Enhancement of photocatalytic activity of $(Zn_{1+x}Ge)(N_2O_x)$ for visible-light-driven overall water splitting by calcination under nitrogen" *Chemical Physics Letters*, **2008**, *457* (1–3), 134–136. DOI: 10.1016/j.cplett.2008.03.065.

22. **Kazuhiko Maeda**, Daling Lu, Kentaro Teramura, Kazunari Domen, "Direct Deposition of Nanoparticulate Rhodium–Chromium Mixed-Oxide on Semiconductor Powder by Band-Gap Irradiation", *Journal of Materials Chemistry (Communications)*, **2008**, *18* (30), 3539–3542. DOI: 10.1039/b808484j.

23. **Kazuhiko Maeda**, Hiroaki Terashima, Kentaro Kase, Masanobu Higashi, Masashi Tabata, Kazunari Domen, "Surface Modification of TaON with Monoclinic-ZrO_2 to Produce a Composite Photocatalyst with Enhanced Hydrogen Evolution Activity under Visible Light" *Bulletin of the Chemical Society of Japan,* **2008**, *81* (8), 927–937. DOI: 10.1246/bcsj.81.927. ***BCSJ Award Article***.

24. **Kazuhiko Maeda**, Miharu Eguchi, W. Justin Youngblood, Thomas E. Mallouk, "Niobium Oxide Nanoscrolls as Building Blocks for Dye-Sensitized Hydrogen Production from

Water under Visible Light Irradiation" *Chemistry of Materials*, **2008**, *20* (21), 6770–6778. DOI: 10.1021/cm801807b.

(2009)

25. Xinchen Wang, **Kazuhiko Maeda**, Arne Thomas, Kazuhiro Takanabe, Xin Gang, Johan M. Carlsson, Kazunari Domen, Markus Antonietti, "A metal-free polymeric photocatalyst for hydrogen production from water under visible light" *Nature Materials*, **2009**, *8* (1), 76–80. DOI: 10.1038/nmat2317.

26. Xinchen Wang, **Kazuhiko Maeda**, Xiufang Chen, Kazuhiro Takanabe, Kazunari Domen, Yidong Hou, Xianzhi Fu, Markus Antonietti, "Polymer Semiconductors for Artificial Photosynthesis: Hydrogen Evolution by Mesoporous Graphitic Carbon Nitride with Visible Light" *Journal of the American Chemical Society (Communications)*, **2009**, *131* (5), 1680–1681. DOI: 10.1021/ja809307s.

27. Kumiko Kamata, **Kazuhiko Maeda**, Daling Lu, Yoko Kako, Kazunari Domen, "Synthesis and Photocatalytic Activity of Gallium-Zinc-Indium Mixed Oxynitride for Hydrogen and Oxygen Evolution under Visible Light" *Chemical Physics Letters*, **2009**, *470* (1), 90–94. DOI: 10.1016/j.cplett.2009.01.012.

28. **Kazuhiko Maeda**, Hiroaki Terashima, Kentaro Kase, Kazunari Domen, "Nanoparticulate precursor route to fine particles of TaON and ZrO_2–TaON solid solution and their photocatalytic activity for hydrogen evolution under visible light" *Applied Catalysis A: General*, **2009**, *357* (2), 206–212. DOI: 10.1016/j.apcata.2009.01.024.

29. Takashi Hisatomi, **Kazuhiko Maeda**, Daling Lu, Kazunari Domen, "The Effects of Starting Materials in the Synthesis of $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Solid Solution on Its Photocatalytic Activity for Overall Water Splitting under Visible Light" *ChemSusChem*, **2009**, *2* (4), 336–343. DOI: 10.1002/cssc.200800156.

30. Hiroshi Hashiguchi, **Kazuhiko Maeda**, Ryu Abe, Akio Ishikawa, Jun Kubota, Kazunari Domen, "Photoresponse of GaN:ZnO electrode on FTO under visible light irradiation" *Bulletin of the Chemical Society of Japan*, **2009**, *82* (3), 401–407. DOI: 10.1246/bcsj.82.401. ***Selected Paper***.

31. **Kazuhiko Maeda**, Hideaki Masuda, Kazunari Domen, "Effect of Electrolyte Addition on Activity of $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Photocatalyst for Overall Water Splitting under Visible Light" *Catalysis Today*, **2009**, published online. DOI: 10.1016/j.cattod.2008.09.002.

32. **Kazuhiko Maeda**, Xinchen Wang, Yasushi Nishihara, Daling Lu, Markus Antonietti, Kazunari Domen, "Photocatalytic Activities of Graphitic Carbon Nitride Powder for Water Reduction and Oxidation under Visible Light" *The Journal of Physical Chemistry C*, **2009**, *113* (12), 4940–4947. DOI: 10.1021/jp809119m.

33. **Kazuhiko Maeda**, Miharu Eguchi, Seung-Hyun Anna Lee, W. Justin Youngblood, Hideo Hata, Thomas E. Mallouk, "Photocatalytic Hydrogen Evolution from Hexaniobate Nanoscrolls and Calcium Niobate Nanosheets Sensitized by Ruthenium(II) Bipyridyl Complexes" *The Journal of Physical Chemistry C*, **2009**, *113* (18), 7962–7969. DOI: 10.1021/jp900842e.

34. **Kazuhiko Maeda**, Byongjin Lee, Daling Lu, Kazunari Domen, "Physicochemical Effects on Photocatalytic Water Oxidation by Titanium Fluorooxynitride Powder under Visible Light", *Chemistry of Materials*, **2009**, *21* (11), 2286–2291. DOI: 10.1021/cm9005162.

35. **Kazuhiko Maeda**, Thomas E. Mallouk, "Comparison of two- and three-layer restacked Dion-Jacobson phase niobate nanosheets as catalysts for photochemical hydrogen evolution" *Journal of Materials Chemistry*, **2009**, *19* (27), 4813–4818. DOI: 10.1039/b903692j.

36. Masaaki Yoshida, Kazuhiro Takanabe, **Kazuhiko Maeda**, Akio Ishikawa, Jun Kubota, Yoshihisa Sakata, Yasunari Ikezawa, Kazunari Domen, "'Role and Function of Noble-Metal/Cr-Layer Core/Shell Structure Cocatalysts for Photocatalytic Overall Water Splitting Studied by Model Electrodes" *The Journal of Physical Chemistry,* **2009**, *113* (23), 10151–10157. DOI: 10.1021/jp901418u.

37. **Kazuhiko Maeda**, Miharu Eguchi, W. Justin Youngblood, Thomas E. Mallouk, "Calcium Niobate Nanosheets Prepared by the Polymerized Complex Method as Catalytic Materials for Photochemical Hydrogen Evolution" *Chemistry of Materials*, **2009**, *21* (15), 3611–3617. DOI: 10.1021/cm9007766.

38. Kazuhiro Takanabe, Tsutomu Uzawa, Xinchen Wang, **Kazuhiko Maeda**, Masao Katayama, Jun Kubota, Akihiko Kudo, Kazunari Domen, "Enhancement of photocatalytic activity of zinc-germanium oxynitride solid solution for overall water splitting under visible irradiation" *Dalton Transactions*, **2009**, 10055–10062. DOI: 10.1039/b910318j.

39. Xiufang Chen, Young-Si Jun, Kazuhiro Takanabe, **Kazuhiko Maeda**, Kazunari Domen, Arne Thomas, Xianzhi Fu, Markus Antonietti, Xinchen Wang, "Ordered Mesoporous SBA-15 Type Graphitic Carbon Nitride: a Semiconductor Host Structure for Mimicking Photosynthesis with Visible Light" *Chemistry of Materials (Communications)*, **2009**, *21* (18), 4093–4095. DOI: 10.1021/cm902130z.

40. Naoyuki Sakamoto, Hajime Ohtsuka, Takahiro Ikeda, **Kazuhiko Maeda**, Daling Lu, Masayuki Kanehara, Kentaro Teramura, Toshiharu Teranishi, Kazunari Domen, "Highly Dispersed Noble-Metal/Chromia (Core/Shell) Nanoparticles as Efficient Hydrogen Evolution Promoters for Photocatalytic Overall Water Splitting under Visible Light"

Nanoscale (Communications), **2009**, *1* (1), 106–109. DOI: 10.1039/b9nr00186g.

41. **Kazuhiko Maeda**, Naoyuki Nishimura, Kazunari Domen, "A precursor route to prepare tantalum (V) nitride nanoparticles with enhanced photocatalytic activity for hydrogen evolution under visible light" *Applied Catalysis A: General,* **2009**, *370* (1–2), 88–92. DOI: 10.1016/j.apcata.2009.09.024.

42. Takashi Hisatomi, **Kazuhiko Maeda**, Kazuhiro Takanabe, Jun Kubota, Kazunari Domen, "Aspects of Water Splitting Mechanism on $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Photocatalyst Modified with $Rh_{2-y}Cr_yO_3$ Cocatalyst" *The Journal of Physical Chemistry C,* **2009**, *113* (51), 21458–21466. DOI: 10.1021/jp9079662.

(2010)

43. Jinshui Zhang, Xiufang Chen, Kazuhiro Takanabe, **Kazuhiko Maeda**, Kazunari Domen, Xianzhi Fu, Markus Antonietti, Xinchen Wang, "Synthesis of a Carbon Nitride Structure for Visible-Light Catalysis by Copolymerization" *Angewandte Chemie, International Edition,* **2010**, *49* (2), 441–444. DOI: 10.1002/anie.200903886.

44. **Kazuhiko Maeda**, Daling Lu, Kentaro Teramura, Kazunari Domen, "Simultaneous Photodeposition of Rhodium-Chromium Nanoparticles on a Semiconductor Powder: Structural Characterization and Application to Photocatalytic Overall Water Splitting", *Energy & Environmental Science*, **2010**, 3 (4), 471–478. DOI: 10.1039/b915064a. ***Selected as Journal Front Cover***.

45. Takashi Hisatomi, Kazuo Miyazaki, Kazuhiro Takanabe, **Kazuhiko Maeda**, Jun Kubota, Yoshihisa Sakata, Kazunari Domen, "Isotopic and Kinetic Assessment of Photocatalytic Water Splitting on Zn-added Ga_2O_3 Photocatalyst Loaded with $Rh_{2-y}Cr_yO_3$ Cocatalyst" *Chemical Physics Letters*, **2010**, *486* (4–6), 144–146. DOI: 10.1016/j.cplett.2010.01.006.

46. Masatomo Yashima, Hiroki Yamada, **Kazuhiko Maeda**, Kazunari Domen, "Experimental Visualization of Covalent Bonds and Structural Disorder in a Gallium Zinc Oxynitride Photocatalyst $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$, Origin of Visible Light Absorption" *Chemical Communications,* **2010**, *46* (14), 2379–2381. DOI: 10.1039/b922008a.

47. **Kazuhiko Maeda**, Masanobu Higashi, Daling Lu, Ryu Abe, Kazunari Domen, "Efficient Nonsacrificial Water Splitting through Two-Step Photoexcitation by Visible Light using a Modified Oxynitride as a Hydrogen Evolution Photocatalyst" *Journal of the American Chemical Society*, **2010**, *132* (16), 5858–5868. DOI: 10.1021/ja1009025.

48. **Kazuhiko Maeda**, Anke Xiong, Taizo Yoshinaga, Takahiro Ikeda, Naoyuki Sakamoto, Takashi Hisatomi, Masaki Takashima, Daling Lu, Masayuki Kanehara, Tohru Setoyama, Toshiharu Teranishi, Kazunari Domen, "Photocatalytic Overall Water Splitting Promoted

by Two Different Cocatalysts for Hydrogen and Oxygen Evolution under Visible Light" *Angewandte Chemie, International Edition (Communications)*, **2010**, *49* (24), 4096–4099. DOI: 10.1002/anie.201001259. ***Selected as a "Hot Paper"***.

49. Leny Yuliati, Jae Hun Yang, Xinchen Wang, **Kazuhiko Maeda**, Tsuyoshi Takata, Markus Antonietti, Kazunari Domen, "Highly-active tantalum (V) nitride nanoparticles prepared from a mesoporous carbon nitride template for photocatalytic hydrogen evolution under visible light irradiation" *Journal of Materials Chemistry (Communications),* **2010**, *20* (21), 4295–4298. DOI: 10.1039/c0jm00341g.

50. **Kazuhiko Maeda**, Naoyuki Sakamoto, Takahiro Ikeda, Hajime Ohtsuka, Anke Xiong, Daling Lu, Masayuki Kanehara, Toshiharu Teranishi, Kazunari Domen, "Preparation of Core–Shell-Structured Nanoparticles (with a Noble-Metal or Metal Oxide Core and a Chromia Shell) and Their Application in Water Splitting by Means of Visible Light" *Chemistry - A European Journal*, **2010**, *16* (26), 7750–7759. DOI: 10.1002/chem.201000616.

51. Daisuke Yokoyama, Tsutomu Minegishi, **Kazuhiko Maeda**, Masao Katayama, Jun Kubota, Akira Yamada, Makoto Konagai, Kazunari Domen, "Photoelectrochemical Water Splitting Using a Cu(In,Ga)Se_2 Thin Film" *Electrochemistry Communications*, **2010**, *12* (6) 851–853. DOI: 10.1016/j.elecom.2010.04.004.

52. Masashi Tabata, **Kazuhiko Maeda**, Masanobu Higashi, Naoyuki Nishimura, Daling Lu, Ryu Abe, Kazunari Domen, "Modified Ta_3N_5 Powder as a Photocatalyst for O_2 Evolution in a Two-Step Water Splitting System with an Iodate/Iodide Shuttle Redox Mediator under Visible Light" *Langmuir (Letters)*, **2010**, *26* (12) 9161–9165. DOI: 10.1021/la100722w.

53. Naoyuki Nishimura, Biet Raphael, **Kazuhiko Maeda**, Laurent Le Gendre, Ryu Abe, Jun Kubota, Kazunari Domen, "Effect of $TiCl_4$ treatment on the photoelectrochemical properties of $LaTiO_2N$ electrodes for water splitting under visible-light" *Thin Solid Films*, **2010**, *518* (20) 5855–5859. DOI: 10.1016/j.tsf.2010.05.094.

54. Masashi Tabata, **Kazuhiko Maeda**, Takahiro Ishihara, Tsutomu Minegishi, Tsuyoshi Takata, Kazunari Domen, "Photocatalytic Hydrogen Evolution from Water Using Copper Gallium Sulfide under Visible-Light Irradiation", *The Journal of Physical Chemistry C*, **2010**, *114* (25), 11215–11220. DOI: 10.1021/jp103158f.

55. Bhavin Siritanaratkul, **Kazuhiko Maeda**, Takashi Hisatomi, Kazunari Domen "Perovskite niobium oxynitrides with wide visible light absorption bands: Synthesis and photocatalytic activity for hydrogen and oxygen evolution from water" *ChemSusChem,* **2010**, accepted.

56. Masaaki Yoshida, Takeshi Hirai, **Kazuhiko Maeda**, Nobuo Saito, Jun Kubota, Hisayoshi Kobayashi, Yasunobu Inoue, Kazunari Domen, "Photoluminescence Spectroscopic and Computational Investigation of the Origin of the Visible Light Response of $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Photocatalyst for Overall Water Splitting" *The Journal of Physical Chemistry C*, **2010**, *114* (36), 15510–15515. DOI: 10.1021/jp100106y.

57. Fuxiang Zhang, **Kazuhiko Maeda**, Tsuyoshi Tataka, Kazunari Domen, "Modification of Oxysulfides with Two Nanoparticulate Cocatalysts to Achieve Enhanced Hydrogen Production from Water with Visible Light" *Chemical Communications,* **2010**, *46* (39), 7313–7315. DOI: 10.1039/C0CC02425B.

[総説・解説]

1. 堂免 一成, **前田 和彦**, "*セラミックス(トピックス)* ～可視光で水を分解する光触媒、窒化ガリウム-酸化亜鉛固溶体を開発～", **2005**, Vol. 40 (8), page 669.

2. **前田 和彦,** 堂免 一成, "*現代化学* ～水から水素をつくる光触媒の開発～", 東京化学同人, **2006**, Vol. 420 (3), page 29–34.

3. **前田 和彦,** 堂免 一成, "*未来材料* ～太陽光で水を分解して水素を製造する光触媒の開発～", エヌ・ティー・エス, **2006**, page 44–45.

4. **Kazuhiko Maeda**, Kentaro Teramura, Nobuo Saito, Yasunobu Inoue, Hisayoshi Kobayashi, Kazunari Domen, "Overall water splitting using (oxy)nitride photocatalysts" *Pure and Applied Chemistry,* **2006**, *78* (12), 2267–2276. DOI: 10.1351/pac200678122267.

5. **前田 和彦,** 堂免 一成, "*科学* ～光触媒による水素製造へのブレイクスルー～", 岩波書店, **2006**, page 659–661.

6. **前田 和彦,** 堂免 一成, "*日本 AEM 学会誌* ～不均一系光触媒を用いた水素製造技術～", **2006**, Vol. 14 (3), page 274–279.

7. **Kazuhiko Maeda**, Kazunari Domen, "New Non-Oxide Photocatalysts Designed for Overall Water Splitting under Visible Light" *The Journal of Physical Chemistry C (Feature Article),* **2007**, *111* (22), 7851–7861. DOI: 10.1021/jp070911w.

8. **Kazuhiko Maeda**, Kentaro Teramura, Kazunari Domen, "Development of Cocatalysts for Photocatalytic Overall Water Splitting on $(Ga_{1-x}Zn_x)(N_{1-x}O_x)$ Solid Solution" *Catalysis Surveys from Asia*, **2007**, *11* (4), 145–157. DOI: 10.1007/s10563-007-9032-2.

9. **前田 和彦**, "さらば学生生活", *触媒*, **2008**, Vol. 50 (1), page 68–69.

10. **前田 和彦**, "*「水素エネルギーシステム(若い研究者の声)」* ~水を分解して水素を製造する光触媒の研究に関するおはなし~" 水素エネルギー協会, **2008**, *33* (3), 101–104.

11. **前田 和彦,** 堂免 一成, "*月刊『ファインケミカル』* ~可視光で水を分解して水素を製造する新しい光触媒の研究開発~" シーエムシー出版, **2008**, *37* (12), 52–59.

12. W. Justin Youngblood, Seung-Hyun Anna Lee, **Kazuhiko Maeda**, Thomas E. Mallouk, "Visible Light Water Splitting Using Dye-Sensitized Oxide Semiconductors", *Accounts of Chemical Research*, **2009**, *42* (12), 1966–1973. DOI: 10.1021/ar9002398.

13. **前田 和彦**, "米国留学記", *触媒*, 2009, Vol. 51 (8), page 622.

14. **Kazuhiko Maeda**, Kazunari Domen, "Solid Solution of GaN and ZnO as a Stable Photocatalyst for Overall Water Splitting under Visible Light", *Chemistry of Materials (Review),* **2010**, *22* (3), 612–623. DOI: 10.1021/cm901917a.

15. **前田 和彦**, "在外研究 MAP (The Pennsylvania State University)", *ペトロテック,* **2010**, in press.

16. **前田 和彦,** 堂免 一成, "可粉末光触媒による水の完全分解反応の促進に有効な貴金属/酸化クロム(コア/シェル)ナノ粒子の開発" *触媒*, **2010**, Vol. 52 (3), page 160–165.

17. **Kazuhiko Maeda**, Kazunari Domen, "Photocatalytic Water Splitting: Recent Progress and Future Challenges", *The Journal of Physical Chemistry Letters (Perspective)*, **2010**, *1* (18), 2655–2661. DOI: 10.1021/jz1007966.

[著書]

1. 堂免 一成, **前田 和彦**, "*可視光応答型光触媒の開発と応用* (執筆分担－第 6 章 6.7~(オキシ)ナイトライド型光触媒~)" シーエムシー出版, **2005**.

2. 堂免 一成, **前田 和彦**, "*水の特性・機能と応用技術* (執筆分担－第 4 章第 2 節~水分解のための可視光応答型非酸化物系光触媒の開発~)" 技術教育出版社, **2005**.

3. **前田 和彦**, 堂免 一成, "*エコマテリアルハンドブック* (執筆分担－Ⅲ部次世代エコマテリアル~ 3.3.3 水素製造－光触媒~)" エヌ・ティー・エス, **2006**.

4. **Kazuhiko Maeda**, Kazunari Domen, "*Theoretical and Computational Chemistry. Nanomaterials: Design and Simulation* ~Chapter 12. Nano-particulate photocatalysts for overall water splitting under visible light~" Elsevier Science Ltd., **2007**, *18*, 301–315.

[国際会議録]

1. **Kazuhiko Maeda**, Kazunari Domen, "Hydrogen Production from Water on Oxynitride

Photocatalysts" *Proceedings of SPIE-The International Society for Optical Engineering: Solar Hydrogen and Nanotechnology,* **2006**, 63400Q/1-63400Q/10.

2. **Kazuhiko Maeda**, Yungi Lee, Xinchen Wang, Kazunari Domen, "Photocatalytic Overall Water Splitting on GaN–ZnO and $ZnGeN_2$–ZnO Solid Solutions under Visible Light" ECS Transactions, **2008**, *13*, 135–141.

[特許]

1. 特許公開 2005－144210, 堂免 一成, 井上 泰宣, 佐藤 淳也, 原 亨和, 高田 剛, **前田 和彦**, "ガリウムナイトライド固溶体からなる水分解用触媒"

2. 特許公開 2007－185605, 堂免 一成, **前田 和彦**, "光触媒用助触媒および光触媒材料"

[招待講演]

1. **前田 和彦**, "水の完全分解反応を指向した新規可視光応答型光触媒の研究開発", 神奈川大学応用化学専攻院生セミナー (2006 年 10 月 28 日, 神奈川大学).

2. **Kazuhiko Maeda**, "Development of a Novel Visible-Light-Responsive Photocatalyst for Overall Water Splitting", Seminar of The Penn State Center for Nanoscale Science (December 3, 2007, The Pennsylvania State University, USA).

3. **Kazuhiko Maeda**, "Photocatalytic Overall Water Splitting under Visible Light: Design of New Materials and Control of Nano-Structure", Max-Planck Institute Seminar (April 2, 2008, Max-Planck Institute, Germany).

4. **Kazuhiko Maeda**, "Development of New Heterogeneous Photocatalysts for Overall Water Splitting under Visible Light", SERC seminar on Integrated Solar Fuels Systems (October 23, 2008, Lawrence Berkeley National Laboratory, USA).

5. **前田 和彦**, "可視光で水を分解して水素を製造する新しい光触媒の研究開発", 平成 21 年度化学セミナー (2009 年 11 月 10 日, 筑波大学).

6. **Kazuhiko Maeda**, Kazunari Domen, "Overall water splitting on oxynitride photocatalysts under visible light", Symposium Sustainable Chemistry: Catalysis and photochemistry for Energy Technologies (July 1, 2010, Rostock, Germany).