Masayuki YAGI, Ph.D.

Professor

Program: Advanced Materials Science and Technology

Area: Materials Science and Technology

Undergraduate: Dept. of Materials Science & Technology

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Professional Expertise

1996: Assistant Professor, Faculty of Education, Niigata University

1997: Associate Professor, Faculty of Education, Niigata University

1999-2001: Postdoctoral Fellowship for Research Abroad. (Visiting fellow, Department of Chemistry, Princeton University)

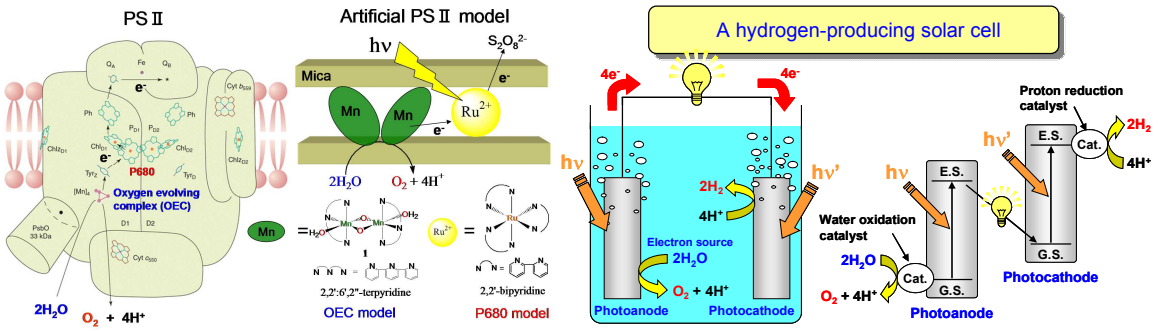
2009 to present: Professor, Department of Materials Science and Technology, Faculty of Engineering, Niigata University

2009 to present: PRESTO fellow, Japan Science and Technology Agency (JST) (PRESTO: Precursory Research for Embryonic Science and Technology)

Research Fields of Interest

Research Fields: Inorganic nano-materials, Coordination chemistry, Electrochemistry, Photochemistry, Catalyst chemistry, Surface and colloid chemistry.

Research Interests: Chemical conversion of solar energy, Artificial photosynthesis, Synthetic catalysts for water oxidation, Water splitting by visible light, Electrocatalysis, Charge transport in heterogeneous matrixes



Education

1996: Ph.D. in Engineering (Majored in Materials Science), Graduate School of Science and Technology, Saitama University, Japan

1993: M.S. in Science (Majored in Chemistry), Graduate School of Science, Ibaraki University, Japan

1991: B.S. in Science (Majored in Chemistry), Ibaraki University, Japan

Professional Societies and Activities

1. The Chemical Society of Japan
2. Japanese Society of Coordination Chemistry
3. The Electrochemical Society of Japan
4. The Japanese Photochemistry Association
5. The Society of Polymer Science, Japan

Awards

1. Award for Encouragement of Research in Polymer Science; The Society of Polymer Science, Japan (2002)
2. JSCC Research Encouragement Awards (JSCC: Japan Society of Coordination Chemistry)

Major Publications

Papers

[1] M. Yagi, S. Umemiya, Novel preparation and photoelectrochemical properties of a tungsten oxide / tris(2,2'-bipyridine)ruthenium (II) complex composite film, *J. Phys. Chem. B*, **2002**, 106, 6355-6357.

[2] M. Yagi, T. Sato, Temperature-controlled charge transfer mechanism in a polymer film incorporating a redox molecule as studied by potential-step chronocouloabsorptometry, *J. Phys. Chem. B*, **2003**, 107, 4975-4981.

[3] M. Yagi, M. Takahashi, M. Teraguchi, T. Kaneko, T. Aoki, Entropy effect on physical displacement of redox molecules in a polymer film as studied by double potential-step chronoabsorptometry, *J. Phys. Chem. B*, **2003**, 107, 12662-12667.

[4] M. Yagi, K. Narita, Catalytic O_2 evolution from water induced by adsorption of $[(OH_2)(terpy)Mn(\mu\text{-}O)_2\ Mn(terpy)(OH_2)]^{3+}$ complex onto clay compounds, *J. Am. Chem. Soc.*, **2004**, 126(26), 8084-8085.

[5] M. Yagi, K. Sone, M. Yamada, S. Umemiya, Preparation and Multicolor electrochromic performance of a WO_3 / tris(2,2'-bipyridine)ruthenium(II) / polymer hybrid film, *Chem. Eur. J.*, **2005** (2), 11, 767-775.

[6] T. Kuwabara, M. Teraguchi, T. Kaneko, T. Aoki, M. Yagi, Analysis and regulation of unusual adsorption of phthalocyanine Zinc (II) into a Nafion film as investigated by UV-Vis spectroscopic techniques, *J. Phys. Chem. B*, **2005**, 109(44), 21202-21208.

[7] M. Yagi, E. Tomita, S. Sakita, T. Kuwabara, K. Nagai, Self-assembly of active IrO_2 colloid catalyst on an ITO electrode for efficient electrocatalytic water oxidation, *J. Phys. Chem. B*, **2005**, 109(46), 21489-21491.

[8] T. Kuwabara, M. Yagi, Insights into adsorption of uncharged macrocyclic complexes into a Nafion film: adsorption characteristics and analysis of tetraphenylporphyrine zinc(II), *J. Phys. Chem. B*, **2006**, 110(30), 14673-14677.

[8] K. Sone, K. Konishi, M. Yagi, Electrochromic hysteresis of Prussian blue film arising from electron-transfer control by a tris(2,2'-bipyridine)ruthenium(II)-doped WO_3 film as studied by a spectrocyclic voltammetry technique, *Chem. Eur. J.*, **2006**, 12(33), 8558-8565.

[10] K. Narita, T. Kuwabara, K. Sone, K. Shimizu, M. Yagi, Characterization and activity analysis of catalytic water oxidation induced by hybridization of $[(OH_2)(terpy)Mn(\mu\text{-}O)_2Mn(terpy)(OH_2)]^{3+}$ and clay compounds, *J. Phys. Chem. B*, **2006**, 110(46),23107-23114.

[11] M. Yagi, K. Narita, S. Maruyama, K. Sone, T. Kuwabara, K. Shimizu, Artificial model of photosynthetic oxygen evolving complex: catalytic O_2 production from water by di-μ-oxo manganese dimers supported by clay compounds, *Biochim. Biophys. Acta – Bioenergetics*, **2007**, 1767(6), 660-665.

[12] K. Sone, M. Teraguchi, T. Kaneko, T. Aoki, M. Yagi, Efficient charge transport through a metal oxide semiconductor in the nanocomposite film with tris(2,2'-bipyridine)ruthenium(II), *J. Phys. Chem. C*, **2007**, 111(31), 11636-11641.

[13] T. Kuwabara, E. Tomita, S. Sakita, D. Hasegawa, K. Sone, M. Yagi, Characterization and analysis of self-assembly of highly active colloidal catalyst for water oxidation onto transparent conducting oxide substrates, *J. Phys. Chem. C*, **2008**, 112(10), 3774-3779.

[14] M. Yagi, M. Toda, S. Yamada, H. Yamazaki, An artificial model of photosynthetic photosystem II: visible-light-derived O_2 production from water by a di-μ-oxo-bridged manganese dimer as an oxygen evolving center, *Chem. Commun.*, **2010**, 46, 8594-8596.

[15] M. Kajita, T. Kuwabara, D. Hasegawa, M. Yagi, Element-saving preparation of an efficient electrode catalyst based on self-assembly of Pt colloid nanoparticles onto an ITO electrode, *Green Chem.*, **2010**, 12, 2150-2152.

[16] M. Yagi, S. Tajima, M. Komi, H. Yamazaki, Highly active and tunable catalysts for O_2 evolution from water based on mononuclear ruthenium (II) monoaquo complexes, *Dalton Trans.,* **2011**, 40 (15), 3802-3804.

[17] H. Yamazaki, T. Hakamata, M. Komi, M. Yagi, Stoichiometric photoisomerization of mononuclear ruthenium (II) monoaquo complexes controlling redox properties and water oxidation catalysis, *J. Am. Chem. Soc.*, **2011**, 133, 8846-8849.

[18] M. Kajita, K. Saito, N. Abe, A. Shoji, K. Matsubara, T. Yui, M. Yagi, Visible-light-driven water oxidation at a polychromium-oxo-electrodeposited TiO_2 electrode as a new type of earth-abundant photoanode, *Chem. Commun.*, **2014**, 50, 1241-1243.

[19] D. Chandra, K. Saito, T. Yui, M. Yagi, Crystallization of tungsten trioxide having small mesopores: highly efficient photoanode for visible-light-driven water oxidation, *Angew. Chem. Int. Ed.*, **2013**, 52, 12606-12609.

Book Chapters

[1] M. Yagi, M. Kaneko, Advances in Polymer Science 199: Emisive Materials · Nanomaterials, "Charge transport and catalysis by molecules confined in polymeric materials and application to future nano-devices for energy conversion", *Adv. Polym. Sci.* Springer, **2006**, 199, 143-188.

[2] K. Sone, M. Yagi, Electrochemical synthesis, charge transport and multi-electron transfer control for a new semiconductor nanocomposite film with a functional molecule, in Electroanalytical Chemistry Research Trends (Edited by K. Hayashi), Nova Science Publishers, Inc., New York, **2008**.

[3] M. Yagi, H. Yamazaki, T. Aoki, K. Narita, Synthetic models of photosynthetic *water oxidizing complex* (OEC): O_2 evolution from water by heterogeneous manganese-oxo complexes, in Photosynthesis: Theory and Applications in Energy, Biotechnology and Nanotechnology (Edited by T. B. Buchner and N. H. Ewingen), Nova Science Publishers, Inc., New York, **2009**.

Reviews

[1] M. Yagi, M. Kaneko, Molecular catalysts for water oxidation, *Chem. Rev.*, **2001**, 101, 21-35.

[2] M. Yagi, A. Syouji, S. Yamada, M. Komi, H. Yamazaki, S. Tajima, Molecular catalysts for water oxidation toward artificial photosynthesis, *Photochem. Photobiol. Sci. (Special Issue: "Photosynthesis from Molecular Perspectives: Towards Future Energy Production)*, **2009**, 8(2), 139-147.

[3] H. Yamazaki, A. Shouji, M. Kajita, M. Yagi, Electrocatalytic and photocatalytic water oxidation to dioxygen based on metal complexes, *Coord. Chem. Rev.*, **2010**, 254(21-22), 2483-2491.