

## **Symposium 11: Advanced Ceramic Surface for Environmental Purification: Photocatalysis and Wettability Control**

### *Main Organizers*

- Toshiya Watanabe, The University of Tokyo, Japan
- Masahiro Miyauchi, AIST, Japan
- Masato Wakamura, Fujitsu LTD, Japan

### *Co-Organizers*

- Masato Machida, Kumamoto University, Japan
- Akira Nakajima, Tokyo Institute of Technology, Japan
- Hisashi Ohsaki, AIST, Japan
- Ming Show Wong, National Dong Hwa University Hualien, Taiwan
- Jinhua Ye, NIMS, Japan
- Hiromi Yamashita, Osaka University, Japan
- Jincai Zhao, Chinese Academy of Sciences (CAS), China

## **Oral Session**

### **Monday, November 15**

Room: 702

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#### **14:15 - 15:45: Photocatalyst Design**

Chair: Toshiya Watanabe (The University of Tokyo, Japan)

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#### **14:15 - 14:45**

##### **S11-001 Applications of Nano-structured Photocatalysts Designed Using Zolites and Mesoporous Silica Materials (Invited)**

H. Yamashita, Y. Horiuchi, Y. Kuwahara, T. Kamegawa, K. Mori; Osaka University, Japan

#### **14:45 - 15:00**

##### **S11-002 Nitrides, Oxynitrides: Photocatalysts for Visible-light Applications**

E. Ray<sup>1</sup>, F. Chevire<sup>1</sup>, F. Tessier<sup>1</sup>, L. L. Gendre<sup>1</sup>, C. L. Paven<sup>1</sup>, R. Benzerga<sup>1</sup>, K. Domen<sup>2</sup>; <sup>1</sup>Universite de Rennes 1, France, <sup>2</sup>The University of Tokyo, Japan

#### **15:00 - 15:15**

##### **S11-003 Design of Structured Macroporous TiO<sub>2</sub> Thin Films and Investigations on their Photofunctional Properties**

T. Kamegawa, N. Suzuki, H. Yamashita; Osaka University, Japan

#### **15:15 - 15:30**

##### **S11-004 Synthesis and Characterization of Ti-containing Mesoporous Silica Thin Films with Highly Hydrophilic Property on Various Materials**

Y. Horiuchi, T. Kamegawa, K. Mori, H. Yamashita; Osaka University, Japan

#### **15:30 - 15:45**

##### **S11-005 Visible-Light-Driven Super-Hydrophilicity by Interfacial Charge Transfer between Metal Ions and Metal Oxide Nanostructures**

M. Miyauchi; National Institute of Advanced Industrial Science and Technology, Japan

#### **15:45 - 16:15 Break**

# Symposium 11

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## 16:15 - 18:00: Process of Photocatalyst

Chair: Masahiro Miyauchi (National Institute of Advanced Industrial Science and Technology, Japan)

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16:15 - 16:45

**S11-006 Vapor Deposited Carbon-containing Titania Thin Film Photocatalysts: Preparation, Structure and Properties (Invited)**

M.-S. Wong; National Dong Hwa University, Taiwan

16:45 - 17:00

**S11-007 Effect of Synthesis Methods on the Photocatalytic DeNO<sub>x</sub> Activity of TiO<sub>2-x</sub>N<sub>y</sub>/CaAl<sub>2</sub>O<sub>4</sub>:(Eu, Nd) Composites**

H. Li, S. Yin, T. Sato; Tohoku University, Japan

17:00 - 17:15

**S11-008 Preparation and Characterization of TiO<sub>2-x</sub>N<sub>y</sub>/Attapulgite for a Visible Light Responsive Photocatalyst**

P. Zhang, S. Yin, T. Sato; Tohoku University, Japan

17:15 - 17:30

**S11-009 The Synthesis and Photovoltaic Property of Polythiophene-TiO<sub>2</sub> Nanocomposite Film**

Y. Xu<sup>1,2</sup>, Y. Ishikawa<sup>1</sup>, Q. Feng<sup>1</sup>; <sup>1</sup>Kagawa University, Japan, <sup>2</sup>Jilin University, China

17:30 - 17:45

**S11-010 Anatase TiO<sub>2</sub> Films Crystallized by RF Plasma Treatment**

H. Ohsaki<sup>1</sup>, R. Andou<sup>2</sup>, A. Kinbara<sup>3</sup>, T. Watanabe<sup>3</sup>; <sup>1</sup>National Institute of Advanced Industrial Science and Technology, Japan, <sup>2</sup>Industrial Technology Institute of Ibaraki Prefecture, Japan, <sup>3</sup>The University of Tokyo, Japan

17:45 - 18:00

**S11-011 Preparation and Characterizations of Yb - doped TiO<sub>2</sub> Photocatalyst Film Prepared by RF-magnetron Sputtering Process By Radio-frequency Magnetron Sputtering Process**

S. Yuenyaw<sup>1</sup>, K. Saito<sup>2</sup>, E. H. Sekiya<sup>2</sup>, P. Sujaridworakun<sup>1</sup>; <sup>1</sup>Chulalongkorn University, Thailand, <sup>2</sup>Toyota Technological Institute, Japan

## Tuesday, November 16

Room: 702

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## 9:15 - 10:15: Wettability and Photocatalyst Function

Chair: Wong Ming Show (National Dong Hwa University, Taiwan)

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9:15 - 9:45

**S11-012 Oxide Surfaces with Higher Dynamic Hydrophobicity (President- Designated)**

T. Watanabe; The University of Tokyo, Japan

9:45 - 10:00

**S11-013 Preparation and Photocatalytic Activity of Niobia Nanosheet Coating Glass**

K. Katsumata<sup>1</sup>, S. Okazaki<sup>2</sup>, T. Shichi<sup>2</sup>, T. Sasaki<sup>3</sup>, A. Fujishima<sup>2</sup>, N. Matsushita<sup>1</sup>, K. Okada<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology, Japan, <sup>2</sup>Central Japan Railway Company, Japan, <sup>3</sup>National Institute for Materials Science, Japan

10:00 - 10:15

**S11-014 Photocatalytic Purification of Organic Compounds Diluted in Water by TiO<sub>2</sub> Supported on Hydrophobically Modified Porous Silica Materials**

Y. Kuwahara, T. Kamegawa, K. Mori, H. Yamashita; Osaka University, Japan

**S11-015** Cancelled

10:15 - 10:45 **Break**

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## 10:45 - 11:45: Material for Environmental Protection

Chair: Hiromi Yamashita (Osaka University, Japan)

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10:45 - 11:00

**S11-016 Visible-light-induced Photocatalysts with High Activity: Preparation and Photocatalysis**  
W. Wang, M. Shang, L. Zhang, S. Sun, J. Ren, J. Xu, W. Yin; Shanghai Institute of Ceramics, China

11:00 - 11:15

**S11-017 3D Hierarchical Heterostructure: Controllable Synthesis and Enhanced Photocatalytic Degradation Performances**  
M. Shang, W. Wang; Chinese Academy of Sciences, China

11:15 - 11:45

**S11-018 Inorganic Polymers for Environmental Protection Applications (Invited)**  
K. J. D. MacKenzie; Victoria University of Wellington, New Zealand

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## 14:15 - 16:00: Application of Photocatalyst

Chair: Akira Nakajima (Tokyo Institute of Technology, Japan)

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14:15 - 14:45

**S11-019 Commercialization of Photocatalyst (Invited)**  
S. Kato; Photocatalytic Materials Inc., Japan

14:45 - 15:00

**S11-020 Evaluation of Ti K-edge in Photocatalytic Ti-substituted Hydroxyapatite by X-ray Absorption Near Edge Structure Analysis and First-Principles Calculations**  
M. Tsukada, K. Nomura, S. Doi, N. Awaji, M. Wakamura; Fujitsu Laboratories Ltd., Japan

15:00 - 15:15

**S11-021 Surface Structure and Properties of Cr(III)-doped Titanium-calcium Hydroxyapatite Photocatalyst**  
M. Wakamura<sup>1</sup>, H. Tanaka<sup>2</sup>, Y. Naganuma<sup>1</sup>, N. Yoshida<sup>3</sup>, T. Watanabe<sup>3</sup>; <sup>1</sup>Fujitsu Laboratories Ltd., Japan, <sup>2</sup>Shimane University, Japan, <sup>3</sup>The University of Tokyo, Japan

15:15 - 15:30

**S11-022 Fabrication of ZnO-Based Visible Light Photocatalyst by Band-gap Engineering and Multi-electron Reduction**  
S. Anandan, M. Miyauchi; National Institute of Advanced Industrial Science and Technology, Japan

15:30 - 16:00

**S11-023 Reduction of Friction Drag on the Solid Surface with Various Wettability. (Invited)**  
M. Sakai<sup>1</sup>, M. Nishimura<sup>1,2</sup>, T. Furuta<sup>1,2</sup>, A. Nakajima<sup>1,2</sup>, A. Fujishima<sup>1,3</sup>; <sup>1</sup>Kanagawa Academy of Science and Technology, Japan, <sup>2</sup>Tokyo Institute of Technology, Japan, <sup>3</sup>Tokyo University of Science, Japan

16:00 - 16:15 **Break**

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## 16:15 - 17:15: Surface of Photocatalyst

Chair: Munetoshi Sakai (Kanagawa Academy of Science and Technology, Japan)

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16:15 - 16:30

**S11-024 Photoinduced Surface Friction Force Change of Polycrystalline Rutile Ceramics under UV Irradiation**  
K. Okudaira, N. Arimitsu, T. Isobe, A. Nakajima; Tokyo Institute of Technology, Japan

16:30 - 16:45

**S11-025 Control of Sliding Acceleration of a Water Droplet on Inclined Hydrophobic Surfaces**  
N. Yoshida, T. Watanabe; The Univ. of Tokyo, Japan

16:45 - 17:15

**S11-026 Wettability and Evaporation of Nanoliter-Scale Droplets on Hydrophobic Silane Coatings (Invited)**  
A. Nakajima<sup>1,2</sup>; <sup>1</sup>Tokyo Institute of Technology, Japan, <sup>2</sup>Kanagawa Academy of Science and Technology, Japan

# Symposium 11

## Poster Session

Monday, November 15

Room: Event Hall

12:00 - 14:00

- S11-P001 Hydrophobic Film on Stainless Steel as Bipolar Plate for Polymer Electrolyte Membrane Fuel Cell**  
D. Zhang, L. Guo, L. Duan; Wuhan University of Technology, China
- S11-P002 Novel Petal Effect: Hafnia Films Containing Glycolic Acid Show Hydrophobicity and High Adhesive Force to Water Droplets**  
A. Tonosaki, T. Nishide; Nihon University, Japan
- S11-P003 Water Purification by WO<sub>3</sub> Photocatalysis and Ozonation under Visible Light Irradiation**  
T. Mano, S. Nishimoto, Y. Kameshima, M. Miyake; Okayama University, Japan
- S11-P004 Preparation and Property of TiO<sub>2</sub> Sphere Particles with Narrow Poresize Distribution by Organic Template Method**  
S. Uchiyama, T. Isobe, A. Nakajima; Tokyo Institute of Technology, Japan
- S11-P005 Visible Light Photochemical Behavior of Titania/Bismuth Ferrite Heterostructures**  
A. Schultz, P. A. Salvador, G. S. Rohrer; Carnegie Mellon University, USA
- S11-P006 Photocatalytic Activities of Various Pentavalent Bismuthates under Visible Light Irradiation**  
T. Takei<sup>1</sup>, R. Haramoto<sup>1</sup>, Y. Yonesaki<sup>1</sup>, N. Kumada<sup>1</sup>, N. Kinomura<sup>1</sup>, T. Mano<sup>2</sup>, S. Nishimoto<sup>2</sup>, Y. Kameshima<sup>2</sup>, M. Miyake<sup>2</sup>; <sup>1</sup>University of Yamanashi, Japan, <sup>2</sup>Okayama University, Japan
- S11-P007 Photocatalytic Decomposition of Methylene Blue, Phenol and Carboxylic Acid by Using Carbon-coated Titania Particles**  
T. Tsumura, K. Sogabe, T. Tsubone, M. Toyoda; Oita University, Japan
- S11-P008 The Photocatalytic Activity of Kikuma Roof-Tiles Coated By Titania**  
S. Okano<sup>1</sup>, M. Matsuura<sup>1</sup>, M. Kan<sup>2</sup>, T. Tanaka<sup>1</sup>; <sup>1</sup>Ehime University, Japan, <sup>2</sup>Ceramics Technology Center of Ehime, Japan
- S11-P009 Synthesis of Anatase TiO<sub>2</sub> Single Crystals with Exposed {101} and {001} Facets and Their Photocatalytic Activities for Hydrogen Evolution**  
Q. D. Truong, M. Kobayashi, H. Kato, M. Kakihana; Tohoku University, Japan
- S11-P010 Influence of Oxygen Ions on the Structure of Titanium Oxide Thin Films Prepared by Plasma Deposition Technique**  
S. Narksitpan<sup>1</sup>, S. Thongtem<sup>2</sup>; <sup>1</sup>Maejo University, Thailand, <sup>2</sup>Chiang Mai University, Thailand
- S11-P011 NO<sub>x</sub> Reduction Activity over Phosphate-supported Platinum Catalysts with Hydrogen Under Oxygen Rich Condition**  
M. Itoh, M. Takehara, M. Saito, K. Machida; Osaka University, Japan