

The 23rd International Conference on
Semiconductor Photocatalysis
&
Solar Energy Conversion
(SPASEC-23)

The 24th International Conference on
Advanced Oxidation Technologies for Treatment of
Water, Air and Soil
(AOTs-24)

FINAL PROGRAM

East China University of Science & Technology, Shanghai, P.R. China
November 5-8, 2018

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MONDAY, NOVEMBER 5, 2018

8:00 – 9:30am REGISTRATION

SESSION I: NEW MATERIALS

9:30 – 9:55am **Research Progress of Photocatalysis Based-on TiO₂ and Current Development of Graphitic Carbon Nitride and Hexagonal Boron Carbon Nitride Photocatalysts**

Masakazu Anpo*, Bo Wang and Xinchun Wang

Fuzhou University, Fuzhou, China

9:55 – 10:20am **Co-Based Graphitic Carbon Nitride for Photocatalytic Water Oxidation**

Shaobin Wang

Curtin University, Perth, Australia

10:20 – 10:40am **Tea & Coffee Break**

10:40 – 11:05am **Pristine and Treated Natural Magnetic Minerals for Effective Photocatalytic Disinfection**

Xia Dehua^{1,2}, Ng Tsz Wai¹, Chen Yanmin¹ and Po Keung Wong¹

¹The Chinese University of Hong Kong, Hong Kong SAR, China

²Sun Yat-sen University, Guangzhou, China

11:05 – 11:30am **Full Organic Photocatalysts with High Visible Light Catalytic and Anti-Cancer Performances**

Yongfa Zhu*

Tsinghua University, Beijing, China

SESSION II: ADVANCED OXIDATION PROCESSES FOR WATER TREATMENT AND FULE /ENERGY GENERATION

11:30 – 11:55am **Simultaneous Wastewater Treatment, Helminth Egg Inactivation, High Purity H₂ Production, and Nutrient Recovery during Membrane-Separated Semiconductor Electrolysis**

Yang Yang and Michael R. Hoffmann

California Institute of Technology, Pasadena, California, USA

11:55 – 12:20pm **The Reaction Mechanism and Degradation Routes of Benzoheterocyclic Pollutants in Wet Air Oxidation Process**
Linbi Zhou^{1,2}, Yongbing Xie^{2*}, Hongbin Cao^{1,2}

¹ Tianjin University, Tianjin, P.R. China

² Chinese Academy of Sciences, Beijing, PR China

12:20 – 1:30pm **Lunch**

1:30 – 1:55pm **Use and Role of Iron species in Advanced Oxidation Processes**
Gilles Mailhot¹, Marcello Brigante¹, K. Hanna², W. Dong³, F. Wu⁴

¹ Université Clermont Auvergne /CNRS UMR 6296, France

² Ecole Nationale Supérieure de Chimie de Rennes, UMR CNRS 6226, France

³ Fudan University, Shanghai, China

⁴ Wuhan University, China

1:55 – 2:20pm **Harnessing Direct Electricity from Wastewater through Solar-Wastewater Fuel Cell**
Wey Yang Teoh

The University of New South Wales, Sydney, Australia

SESSION III: ORGANIC SYNTHESIS

2:20 – 2:45pm **Heterogeneous Photocatalytic Organic Synthesis: State-Of-The-Art and Future Perspectives**

Detlef W. Bahnemann

Gottfried Wilhelm Leibniz Universität Hannover, Hannover, Germany.

And Saint-Petersburg State University, Saint-Petersburg, Russia

2:45 – 3:10pm **Selective Semiconductor Photocatalysis through Microflow Chemistry: A Green Approach for Organic Synthesis**

Juan Carlos Colmenares^{*}, Tomasz Dańko, Vaishakh Nair

Institute of Physical Chemistry, Polish Academy of Sciences, Warsaw, Poland

3:10 – 3:30pm **Coffee Break**

SESSION IV: PHOTOCATALYST SYNTHESIS – I

3:30 – 3:55pm **Surface Modification of Titanium Dioxide with APTES and its Application for Photocatalytic Phenol Photodegradation**

Antoni W. Morawski, Ewelina Kusiak-Nejman, Agnieszka Wanag, Paulina Sienkiewicz, Sylwia Mozia

West Pomeranian University of Technology, Szczecin, Poland

- 3:55 – 4:20pm **Modified Photo(Active) Semiconductor Nanomaterials for Environmental Sustainable Applications**
B. Barrocas, V. C. Ferreira, O. C. Monteiro
 Universidade de Lisboa, Lisboa, Portugal
- 4:20 – 4:45pm **Hierarchical Assembly of New Photocatalysts and Study on Their Controlling Environmental Pollution**
Hexing Li
 Shanghai University of Electric, P.R. China
- 4:45 – 5:10pm **The Inhibition of Hydrogen and Oxygen Recombination by Halogen Atoms and Its Effect on Over-All Water Splitting over Pt-TiO₂**
Gongxuan Lu
 Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, China
- 5:10 – 5:35pm **Fabrication and Application of WO₃ as Highly-Efficient Photocatalysts for Solar Energy Utilization**
Byeong-Kyu Lee*, Tayyebbeh Soltani
 University of Ulsan, Ulsan, Republic of Korea
- 5:35 – 5:50pm **Anchoring TiO₂ on Carbon Materials to Enhance Photoactivity and Applicability**
Alex T Kuvarega and **Bhekie B Mamba**
 University of South Africa, Johannesburg, South Africa
- 5:50 – 6:05pm **Sol-gel Synthesis of ZnO Nanoparticles Calcined at varying Temperature for Photocatalytic Degradation of Ethylbenzene**
Darlington C. Ashiegbu, **Herman J. Potgieter**
 University of the Witwatersrand, Johannesburg, South Africa

TUESDAY, NOVEMBER 6, 2018

SESSION V: PHOTOCATALYST SURVEYS

- 8:30 -8:55am **Titania P25: A Historical Brief, the Status Quo and Prospects**
Kunlei Wang^{1,2}, Zhishun Wei^{1,3}, Maya Endo¹, Agata Markowska-Szczupak⁴, Christophe Colbeau-Justin⁵, Bunsho Ohtani^{1,2}, Ewa Kowalska^{1,2}
¹Institute for Catalysis (ICAT), Hokkaido University, Sapporo, Japan
²Graduate School of Environmental Science, Hokkaido University, Sapporo, Japan

³Hubei University of Tech., Wuhan, China

⁴West Pomeranian Univ. Tech., Szczecin, Poland

⁵Paris-sud University, Orsay, France

8:55 – 9:20am **Perovskite and Dye-Sensitized Solar Cells: What Can We Learn From Electrochemistry?**

L. Kavan

J. Heyrovsky Institute of Physical Chemistry, Prague , Czech Republic

9:20 – 9:45am **Copper and Copper Oxide Based Materials for Energy Conversion**

Ying Yu, Luo Yu, Xin Ba and Guodong Shi

Central China Normal University, Wuhan, P.R. China

9:45 – 10:10am **Effective Ways to Enhance Photocatalytic Activity of ZnO Nanopowders: High Crystalline Degree, More Oxygen Vacancies, and Preferential Growth**

Shujua Qiu, Hantao Chen, Leshu Yu*

Shangrao Normal University, Jiangxi, PR China

10:10 – 10:30am **Coffee Break**

SESSION VI: UV, SONOCATALYTIC, ELECTROCHEMICAL AND PLASMA OXIDATION PROCESSES

10:30 – 10:55am **Influence of Variable Amino Acids on the Destruction of Microcystin Variants by UV/chlorine process**

Minghao Kong, Xiaodi Duan, Dionysios D. Dionysiou

University of Cincinnati, Cincinnati, Ohio, USA

10:55 – 11:20am **Sonocatalytic Destruction of Methyl paraben in Water Using a Costless Clay Mineral**

Nilsun H. Ince*, Başak Savun-Hekimoğlu

Boğaziçi University Istanbul, Turkey

11:20 – 11:45am **Kinetics Investigation of Oxygen Reduction Reaction in Water Treatment System**

Hong Liu

Guangzhou University, Guangzhou, China

11:45 – 12:10pm **Redox Conversion of Arsenite and Nitrate in the UV/Quinone Systems**
Zhihao Chen, Jiyuan Jin, Xiaojie Song, Guoyang Zhang, Shujuan Zhang*
Nanjing University, Nanjing, P. R. China

12:10 – 1:30pm **Lunch**

1:30 – 1:55pm **Application of Atmospheric Pressure Plasma Technology for Overall Environment of Agricultural Products Upbringing in Japan**
Shin-ichi Aoqui¹, Noriko Horibe¹, Tamiko Ohshima², Hiroharu Kawasaki², Fumiaki Mitsugi³
¹Sojo Univ., Kumamoto, Japan
² Sasebo National College of Tech., Sasebo, Japan
³Kumamoto Univ., Kumamoto, Japan

1:55 – 2:20pm **Reactions in Non-Thermal Plasma and Atmospheric Chemistry**
Lev N. Krasnoperov
New Jersey Institute of Technology, Newark, NJ, U.S.A.

SESSION VII: CARBON DIOXIDE TO HYDROCARBONS

2:20 – 2:45pm **Thermodynamic and Kinetic Control of CO₂ Reduction**
Young Soo Kang
Sogang University, Seoul, Korea

2:45 – 3:10pm **Efficient Solar Light CO₂ Conversion to Hydrocarbon Fuels**
Su-II In
DGIST, South Korea

3:10 – 3:30pm **Coffee Break**

3:30 – 3:55pm **Modifications of Porous Ti-based Photocatalysts and Applied in CO₂ Photocatalytic Reduction towards Selective CH₄ Generation**
Chunyang Dong, Mingyang Xing, Jinlong Zhang*
East China University of Science and Technology, Shanghai, P.R. China

- 3:55 – 4:20pm **Semiconductor Assisted Photocatalysis for CO₂ Reduction**
Yimin A. Wu¹, Ian McNulty¹, Kah Chun Lau², Larry A. Curtiss²,
Yuqi Liu¹, Tijana Rajh¹
¹ Center for Nanoscale Materials, Argonne National Laboratory, Argonne, USA
² Materials Science Division, Argonne National Laboratory, Argonne, USA
- 4:20 – 4:45pm **Photo-assisted CO₂ Methanation Promotion over Ru/TiO₂ (1 0 1): A Discussion of Facets-Hydroxyl Effect**
Ke Wang, Xun Chen, Wenxin Dai*
Fuzhou University, Fuzhou, P. R. China

SESSION VIII: HYDROGEN GENERATION

- 4:45 – 5:10pm **Efficient H₂ Production from Formic Acid over Plasmonic Au@Pd Nanoparticle Supported on Metal Organic Framework**
Meicheng Wen,¹ Yasutaka Kuwahara,^{1,2} Kohsuke Mori,^{1,2}
Hiroshi Yamashita*^{1,2}
¹ Osaka University, Osaka, Japan
² Kyoto University, Kyoto, Japan
- 5:10 – 5:35pm **Simultaneous Photocatalytic Production of Hydrogen and Photodegradation of Organic Wastewater by Sunlight**
Jeffrey Chi-Sheng Wu
National Taiwan University, Taipei, Taiwan
- 5:35 – 6:00pm **Boosting Photocatalytic Hydrogen Evolution from Water Splitting by the Construction of Z-Scheme System**
Jian-Wen Shi*¹, Dandan Ma, Yajun Zou, Chunming Niu
Xi'an Jiaotong University, Xi'an, China

WEDNESDAY, NOVEMBER 7, 2018

SESSION IX: OXIDATION PROCESSES MEDIATED BY HYDROXIL RADICAL, SULFATE RADICAL ION AND CATALYTIC OZONATION

- 8:30 – 8:55am **Combined Adsorption/Oxidation Approach for Contaminant Removal Using Persulfate as Oxidant**
Anett Georgi, Viet Nguyen The, Frank-Dieter Kopinke,
Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany

8:55 – 9:20am **Kinetic Study of Hydroxyl and Sulfate Radical-mediated Oxidation of Pharmaceuticals in Wastewater Effluents**
Weihua Song
Fudan University, Shanghai, P. R. China

9:20 – 9:45am **Catalytic Ozonation: Recent Results and Perspectives**
Yuting Yuan, Shikha Garg, Jinxing Ma, Chao Ji, Xuefei Liu, Bin Dong and T. David Waite
The University of New South Wales, Sydney, Australia

SESSION X: PHOTOCATALYTIC MECHANISMS AND ANALYSIS

9:45 – 10:10am **Understanding Heterogeneous Photocatalysis: Novel Concepts to Go Beyond Band-Structure Model**
Bunsho Ohtani
Hokkaido University, Sapporo, Japan

10:10 – 10:30am **Coffee Break**

10:30 – 10:55am **Kinetics of Liquid Phase Photocatalyzed Reaction: A Frequent Disguise!**
David Ollis
North Carolina State University, USA

10:55 – 11:20am **An Overview on the Use of Selected Organic Molecules to Determine the Photocatalytic Active Species, Mechanisms and Pathways in Water**
Pierre Pichat
"Photocatalyse et Environnement", CNRS/Ecole Centrale de Lyon (STMS), Ecully, France

11:20 – 11:45am **Towards a Rational Design of New Photocatalytic Materials for Solar Energy Conversion Using Density Functional Theory**
Moussab Harb* and Luigi Cavallo
University of Science and Technology (KAUST), Kingdom of Saudi Arabia (KSA)

SESSION XI: PHOTOCATALYTIC AIR TREATMENT

11:45am – 12:10pm **Combination of Photocatalysis and Other Processes for Air Treatment: Can We Expect Synergy?**

C. Guillard

Université de Lyon, UMR 5256, CNRS, Université Claude Bernard
Lyon 1, Villeurbanne, France

12:10 – 1:30pm **Lunch**

1:30 – 1:55pm **Indoor VOCs degradation by 185 nm UV photocatalysis**

Pengyi Zhang,¹ **Hong Zheng**,² **Tongzhou Xu**,² **Jeonghyun Kim**¹

¹ School of Environment, Tsinghua University;

² China University of Geosciences, Beijing, P.R. China

SESSION XII: PHOTOCATALYTIC MECHANISMS AND PROBES

1:55 – 2:20pm **Adsorption-Determined Hole Transfer during Photocatalytic Oxidation**

Chuncheng Chen, **Hongna Zhang**, **Hua Sheng**, **Hongwei Ji**,
Wanhong Ma, **Jincai Zhao**

Institute of Chemistry, Chinese Academy of Sciences, Beijing, PR China

2:20 -2:45pm **Comparison of Chemical Probes for Quantification of Photocatalytic Activity**

Valentina Leandri and **Mats Jonsson**

KTH Royal Institute of Technology, Stockholm, Sweden

SESSION XIII: PHOTOELECTROCHEMICAL PROCESSES

2:45 – 3:10pm **Study on the Mechanism of Piezoelectric Potential Driven Charge Separation for Catalytic Purification of Environmental Pollutants**

Zhenfeng Bian*, **Yawei Feng**, **Hexing Li**

Shanghai Normal University, Shanghai, PR China

3:10 – 3:30pm **Coffee Break**

3:30 – 3:55pm **Photocatalytic Thin Films for Photoelectrochemical Measurement of Chemical Oxygen Demand**

Sujun Yuan, **Weixin Heng**, **Yaogang Li**, **Qinghong Zhang*** and **Hongzhi Wang**

Donghua University, Shanghai, P. R. China

3:55 – 7:30pm **Free Time**

7:30 -10:00pm **Reception and Conference Banquet**

THURSDAY, NOVEMBER 8, 2018

SESSION XIV: GRAPHITIC CARBON NITRIDE

8:30 – 8:55am **C₃N₄-based Direct Z-scheme Photocatalyst**
Jianguo Yu
Wuhan University of Technology, Wuhan, Hubei, China

8:55 – 9:20am **Unusual Reduction of Graphene Oxide by Titanium Dioxide Electrons Produced by Ionizing Radiation: Reaction Products and Mechanism**
David Behar¹, Tijana Rajh² and Joseph Rabani^{1*}
¹ The Hebrew University of Jerusalem, Jerusalem, Israel
² Argonne National Laboratory, Argonne, IL, USA

9:20 – 9:45am **Graphitic Carbon Nitride Polymers for Sustainable Photoredox Catalysis**
Xinchen Wang
Fuzhou University, Fuzhou, China

9:45 – 10:00am **Effective Photocatalytic Degradation of Pharmaceutical Tetracycline Using Ba/W Codoped G-C₃N₄ Photocatalyst under Visible Light Irradiation**
Thanh-Son Bui, Tayyebeh Soltani, Byeong-Kyu Lee*
University of Ulsan, Ulsan, Republic of Korea

10:00 – 10:15am **Novel G-C₃N₄/Fe₃O₄/Metal Tungstates as Visible-Light-Responsive Photocatalysts: Facile Synthesis and Exceptional Photocatalytic Performances**
Aziz Habibi-Yangjeh*, Mitra Mousavi
University of Mohaghegh Ardabili, Ardabil, Iran

10:15 – 10:45am **Coffee Break**

SESSION XV: PHOTOCATALYST SYNTHESIS – II

- 10:45 – 11:10am **Size-Dependent Plasmonic Effects in Photocatalytic Reactions**
Hye Jin Kang and Wan In Lee*
Inha University, Incheon, Korea
- 11:10 – 11:35am **Solvothermal Synthesis of $\text{TiO}_{2-x}\text{N}_y/\text{TiO}_{2-x}\text{F}_y$ Composite and its Enhanced Visible Light Induced Photocatalytic DeNO_x Ability**
Shu Yin*, Shio Komatsuda, and Yusuke Asakura
Tohoku University, Aobaku Sendai, Japan
- 11:35am – 12:00pm **Synthesis and Photocatalytic Activity of Bismuth-Based Heterojunction for Tetracycline Hydrochloride**
Qiong Wang¹, Panjie Li¹, Wenxing Huang¹, Kaichao ZuoJiao¹, Caiyun Jiang², Yuping Wang¹
¹Nanjing Normal University, China
²Jiangsu Institute of Commerce, China
- 12:00 – 12:25pm **Magnetron-Sputtered Bismuth Oxide-Based Low Band Gap Photocatalysts and Their Potential for Water Treatment Application**
Marina Ratova, James Redfern, Joanna Verran and Peter J. Kelly
Manchester Metropolitan University, Manchester, UK
- 12:25 – 12:30pm **Concluding Remarks / Adjourn**
- 12:30 – 1:30pm **Lunch**

POSTERS

Investigation into Mechanism behind Peroxymonosulfate Activation by Surface-loaded Metal Nanoparticles

Yongyoon Ahn and Jaesang Lee*

Korea University, Seoul, Korea

Cu₂ZnSnS₄ (CZTS)-ZnO: A noble metal-free hybrid Z-scheme photocatalyst for enhanced solar-spectrum photocatalytic conversion of CO₂ to CH₄

Shahzad Ali, Muhammad Zubair, and Su-Il In*

DGIST, Republic of Korea

Solar Spectrum Photocatalytic Conversion of CO₂ to CH₄ Utilizing TiO₂ Nanotube Arrays Embedded with Graphene Quantum Dots

HyeRim Kim¹, Muhammad Zubair¹, Abdul Razzaq^{1,2}, Craig A. Grimes³, Su-Il In^{1,*}

¹ DGIST, Republic of Korea

² COMSATS Institute of Information Technology, Pakistan

³ Flux Photon Corporation, Raleigh, North Carolina, United States

Highly Enhanced and Stable Activity of Defect Induced Titania Nanoparticles for Solar Light Driven CO₂ Reduction into CH₄

Saurav Sorcar¹, Yunju Hwang¹, Craig A. Grimes², and Su-il In^{1,*}

¹ DGIST, Republic of Korea.

² Flux Photon Corporation, Raleigh, North Carolina, United States

Hybrid CuxO-TiO₂ Heterostructured Composites for Photocatalytic CO₂ Reduction into CH₄

Young Ho Park, and Su-il In*

DGIST, Republic of Korea

Photocatalytic Hydrogen Production from Ammonia over Lanthanides Doped TiO₂ in Powder Form and Immobilized on Foam

Miroslava Edelmannová¹, Martin Reli¹, Lenka Matějová¹, Ivana Troppová¹, Lada Dubnová², Libor Čapek², Dana Dvoranová³, Piotr Kuśtrowski⁴, Kamila Kočí^{1,*}

¹ Technical University of Ostrava, Ostrava - Poruba, Czech Republic

² University of Pardubice, Pardubice, Czech Republic

³ Slovak University of Technology in Bratislava, Bratislava, Slovak Republic

⁴ Jagiellonian University, Kraków, Poland

Degradation of Styrene from Waste Gas Stream by Advanced Oxidation Processes

Kamila Kočí^{1,*}, Martin Reli¹, Ivana Troppová¹, Tomáš Prostějovský¹, Radim Žebrák²

¹ Technical University of Ostrava, Ostrava-Poruba, Czech Republic

² Dekonta Inc, Czech Republic

