

Photocatalytic and Superhydrophilic Surfaces Workshop, PSS 2017

Provisional Programme

7th-8th December 2017, Museum of Science and Industry

Day one

09:30 Registration and coffee

09:55 Opening remarks from the Chair

10:00 **Plenary Presentation: Geoff Cooper-Smith, Facilitated Research;**
The Opportunities for Catalysts in the Water and Wastewater Industry

Session 1.1 Materials 1 (Chair: C Tavares)

10:30 Invited Presentation 1: Dr Inmaculada Polo López, CIEMAT - Plataforma Solar de Almería;
'Solar water purification and reuse: new photocatalytic materials and pilot plant experiences'

11:00 Paper C1: Antonio Patrocínio, Universidade Federal de Uberlandia, Brazil; *'Photocatalytic properties of Layer-by-layer thin films of hexaniobate nanoscrolls'*

11:20 Break and Posters

Session 1.2 Materials 2

11:40 Invited Presentation 2: Dr Gian Luca Chiarello, Università degli Studi di Milano;
'Exploiting photonic and electronic properties of semiconductor thin films to enhance their photocatalytic performance'

12:10 Paper C2: Yuanzhi Li, Wuhan University of Technology; *'UV-Vis-IR driven catalytic abatement of VOCs on manganese oxide and its nanocomposites'*

12:30 **Lunch and Poster Session**

13:30 **Museum Tour:** Manchester Mills demonstration*

Session 2.1 Production Methods 1 (Chair: P Kelly)

14:00 Invited Presentation 3: Dr Nicolas Keller, ICPEES, CNRS/University of Strasbourg;
'Layer-by-layer self-assembled titania nanoscale thin films for photocatalysis'

14:30 Paper C3: Frank Neumann/Alena Nickel, Fraunhofer IST; *'Examinations of the low-temperature-crystallization of Titanium dioxide thin films'*

14:50 Paper C4: Joanna Wojciechowska, Lodz University of Technology and University of Strasbourg; *'Light-driven synthesis of sub-nanometric metallic Ru catalysts on TiO₂'*

15:10 Paper C5: Hegqing Li, Gencoa Ltd.; *'Low temperature deposition of photocatalytic titanium oxide coatings by magnetron sputtering'*

15:30 Break and Posters

Session 2.2 Production Methods 2

15:50 Invited Presentation 4: Dr Marina Ratova, Manchester Metropolitan University;
'Production of photocatalytically active materials by magnetron sputtering techniques'

16:10 Paper C6: Tobias Graumann, Fraunhofer IST; '*Process development and future applications of photocatalytic Atomic Layer Deposition coatings*'

16:30 Paper C7: Marlene Calheiros/C. J. Tavares, University of Minho '*Synthesis of Bi₂O₃:TiO₂ nano structured thin films for photocatalytic applications*'

16:50 Break

17:30 Poster Session. Drinks served

19:30 Evening Meal

Day two

08:30 Registration and coffee

Session 3.1 Testing, Modelling and Characterisation 1 (Chair: G West)

09:00 Invited Presentation 5: Dr Javier Marugán, University Rey Juan Carlos: '*Simulation and Design of Photocatalytic Systems*'

09:30 Paper C8: Ceyda Zeynep Koyuncu, TUBITAK/MRC, Materials Institute; '*Effects of Cr, Zn, Ag dopants on the Photocatalytic Activity of TiO₂*'

09:50 Paper C9: Michael Nolan, Tyndall National Institute; '*Simulation-Lead Design of Photocatalysts*'

10:10 Paper C10: Silvia Suárez, Unit of Analysis and Photocatalytic Treatment of Pollutants in Air; '*Highly efficient zeolite-TiO₂ hybrids photocatalysts for pollution control: from TiO₂ nanoparticles to Decahedral Anatase Particles*'

10:30 Break and Posters

Session 3.2 Testing, Modelling and Characterisation 2

10:50 Invited Presentation 6: Prof Joanna Verran, Manchester Metropolitan University; '*Towards rapid testing methods for antimicrobial activity targeted at non-specialists*'

11:20 Paper C11: Laia Francàs, Imperial College London; '*Shining light into the reaction mechanisms of metal oxides photoanodes*'

11:40 Paper C12: Yamen Al Salka, Leibniz Universität Hannover; '*Synthesis of effective bare TiO₂ for photocatalytic hydrogen evolution using an optimised EISA method*'

12:00 Lunch and Poster Session

Session 4.1 Applications 1 (Chair: P Kelly)

13:00 Invited Presentation 7: Prof Peter Robertson, Queens University of Belfast; '*Photocatalytic production of bioethanol from cellulose*'

13:30 Paper C13: Juliana Marques, University of Minho; '*Potential use of TiO₂ Photocatalysts for Chemical Compound Delivery*'

13:50 Paper C14: Sami Rtimi, Swiss Federal Institute of Technology, EPFL-SB-ISIC-GPAO; '*Uniform, transparent polyethylene-TiO₂ films leading to bacterial inactivation under solar irradiation: within the time or beyond the time hydrophobic to super-hydrophilic conversion?*'

14:10 Break and Posters

Session 4.2 Applications 2

14:30 Invited Presentation 8: Dr Junwang Tang, Director of UCL Materials Hub, University College London; '*Solar driven H₂ production*'

15:00 Paper C15: Josef Krysa, University of Chemistry and Technology, Prague, Czech Republic, '*TiO₂ and hematite nanostructured/nanotubular photoanodes for energy and environmental applications*'

15:20 Paper C16: Jing Shang, Peking University; '*Photocatalytic and photoelectrocatalytic properties of Ti-substituted hydroxyapatite: the oxidative and reductive removal of environmental pollutants*'

15:40 Paper C17: Dr David Sawtell, MMU; '*Overview of photocatalytic plasma reactors for waste gas treatment and chemical synthesis*'

16:00 Closing remarks and end of workshop

* Manchester Mills demonstration. The demonstration provides an overview of how cotton is processed from its raw state to the finished product using a range of working historical machines to demonstrate the process. The narrative also includes references to the working conditions in the mills and the impact that this had on people's health and wellbeing.

Poster Session

P1: One-step synthesis of nitrogen doped TiO₂ nanoparticles and their photocatalytic behaviour

Tiago D. Gomes, Juliana Marques, Carlos J. Tavares*
Centre of Physics, University of Minho, Guimarães, Portugal

P2: PHOTOCATALYTIC ASPHALT MIXTURE: INFLUENCE OF TEMPERATURE, SPRAYING RATE AND INCORPORATION PERCENTAGE OF TiO₂

I. Rocha Segundo¹, S. Oliveira², E. Freitas³, J. O. Carneiro⁴, S. Landi Júnior⁵
¹Civil Engineering Department, University of Minho, Azurém Campus, Guimarães, Portugal

P3: Extremely efficient full solar spectrum light driven thermocatalysis for benzene purification promoted by a hot electron-induced photoactivation on Pt/CeO₂ nanocomposite

Mingyang MAO, Qian ZHANG, Yuanzhi LI *
State Key Laboratory of Silicate Materials for Architectures (Wuhan University of Technology), 122 Luoshi Road, Wuhan 430070, P. R. China.

P4: Silica cluster modified Ni catalyst for solar light driven carbon dioxide reforming of methane

Hui HUANG, Shaowen WU, Yuanzhi LI
State Key Laboratory of Silicate Materials for Architectures (Wuhan University of Technology), 122 Luoshi Road, Wuhan 430070, P. R. China.

P5: Solar light Photocatalytic Oxidation of Formic Acid using BiFeO₃; XPS investigation

Wegdan Ramadan and Detelf Bahnemann
Institut für Technische Chemie, Leibniz Universität Hannover, Callinstr. 3, 30167, Hannover, Germany

P6: Commercial photocatalytic products to reduce NO_x pollution from cities: From lab to urban asphalt

S. Suárez, C. Martínez, O. Vilanova, B. Sánchez
FOTOAIR-Ciemat, Unit of Analysis and Photocatalytic Treatment of Pollutants in Air. Avda. Complutense 40, 28040 Madrid, Spain

P7: Monitoring of vacuum processes using a remote plasma emission spectroscopy based sensor

Dr. Joseph Brindley, Research and Development, Gencoa Ltd, 4 De Havilland Drive, Estuary Commerce Park, Liverpool, UK L24 8RN

P8: Role of Emerging Contaminants on Solar Photocatalytic Treatment of Humic Matter

Nazmiye Cemre Birben and Miray Bekbolet*
Bogazici University, Institute of Environmental Sciences, Bebek, Istanbul

P9: Investigating the removal of taste and odour compounds in drinking water

Peter Kelly, Helen Casey, Debra Whitehead, Craig Banks, Manchester Metropolitan University

P10: A Comparison of Techniques for the Low Temperature Sputter Deposition of Crystalline Photocatalytic Titania onto Polymer Surfaces

Glen West, Marina Ratova, and Brice Delfour-Peyrethon, Manchester Metropolitan University

P11: Carbon coated TiO₂ films with chlorine doping for water purification photocatalysis

G. Odling, A. Ivaturi, E. Chatzisyneon and N. Robertson
School of Chemistry, University of Edinburgh

P12 Photoelectrochemical properties of BiVO₄ thin film photoanodes prepared by aerosol pyrolysis

Sarka Pausova, University of Chemistry and Technology Prague

P13: Titania (hematite) nanotubular structures prepared by anodization of Ti (Fe) films on FTO.

Sarka Pausova, University of Chemistry and Technology Prague

P14: Towards highly active and nitrate selective supported TiO₂ photocatalysts for De-NO_x application

Amer Hakki¹, Lu Yang^{1,2}, and Donald E Macphee¹

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P 15: Synergistic photocatalytic oxidation of formaldehyde over nitrate composited TiO₂

Jiali Zhu, Jing Shang, State Key Joint Laboratory of Environmental Simulation and Pollution Control, College of Environmental Sciences and Engineering, Peking University, Beijing 100871, People's Republic of China

P16: Tuning the composition of mesoporous resin-templated TiO₂ macrobeads for optimized photocatalytic performance

Q. A. Naqvi^a, M. Ratova^a, R. Klaysri^{a,b}, P. J. Kelly^a, M. Edge^a, S. Potgieter-Vermaak^{a,c}, and L. Tosheva^{a,*}

^aFaculty of Science and Engineering, Manchester Metropolitan University, Chester Street, Manchester, M1 5GD, United Kingdom

P17: Photocatalytic degradation of organic pollutants in water using Ca_xMnO_y-TiO₂ composites

Preetam K. Sharma^{1,*}, Salma Buggarani², Mohammed El Azzouzi², J. Anthony Byrne¹

¹NIBEC, Ulster University, Newtownabbey, BT37 0QB, UK.

P18: Development of a Gas Phase Reactor for CO₂ Photoreduction

Maria Ana L.R.M. Cortes*, Jeremy W.J. Hamilton, Preetam K. Sharma, Alan Brown, and J. Anthony Byrne.

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