



€-MRS Spring Meeting 2019

IUMRS - ICAM International Conference on Advanced Materials
May 27-31 | Acropolis Congress Centre | Nice | France

SYMPOSIUM H

Materials for applications in photocatalysis and photoconversion

Symposium Organizers :

Anne MORRISSEY, Dublin University, Ireland

Giuliana IMPELLIZZERI, CNR-IMM, Catania, Italy

J. Anthony BYRNE, Ulster University, U.K..

Valérie KELLER, CNRS – University of Strasbourg, France

To be published in Materials Sciences
in Semiconductor Processing, Elsevier

H



 **Interreg**
Italia-Malta
Micr WatTS

Fondo Europeo di Sviluppo Regionale
European Regional Development Fund



16:30	Mesoporous Networks of β-Ni(OH)₂ Modified CdS Nanoparticles as Efficient Photocatalysts for Visible-Light Hydrogen Evolution Ioannis Vamvasakis, Gerasimos S. Armatas* Department of Materials Science and Technology, University of Crete, Heraklion 71003, Greece	H P2.61
16:30	Investigations of EPR and optical properties of carbon nitride oxide (g-C₃N₄) O as perspective photocatalytic material M. Bondarenko, M. Zahornyi, A. Ragulya, P. Silenko, Yu. Solonin, N. Gubareni, O. Khyzhun, N. Ostapovskaya Frantsevich Institute for Problems of Materials Science of NASU, Krzhyzhanovskiy St. 3, 03142 Kiev, Ukraine	H P2.62
16:30	The Next Opportunity of MoS₂ for Electrolytic Hydrogen Evolution Reaction---Hybridizing MoS₂ with Other Electrocatalysts Shu Hearn Yu, Wenzhou Chen, Hongyu Wang, Dai Haiwen, Hui Pan, Daniel H.C. Chua Material Science and Engineering, National University of Singapore, Institute of Applied Physics and Materials Engineering, University of Macau, Macau, SAR, China.	H P2.63
16:30	Sonohydrothermal synthesis of noble-metal-free Ti@TiO₂ core-shell photocatalysts Sara El Hakim, Tony Chave, Sergey I. Nikitenko ICSM, UMR 5257, CEA, CNRS, ENSCM, Univ Montpellier, Marcoule, France	H P2.64
16:30	Photovoltaic performance of n-type SnS active layer in FTO/PEDOT:PSS/SnS/Ag structure F. Aousgi 1, N. Khemiri 2, B. Khalallah 2, R. Chtourou 1 1Laboratory of Nanomaterials and Renewable Energy Systems LANSER, Research and Technology Center of Energy, Borj-Cedria Science and Technology Park, BP 95, 2050 Hammam-Lif, Tunisia, 2Université Tunis El Manar, Ecole National d'Ingénieurs de Tunis, Laboratoire de Photovoltaïque et Matériaux Semi-conducteurs 1002, Tunis, Tunisia.	H P2.65
16:30	Molar Optimization And Comparison Of SnxSy Thin Films Deposited By Spray Pyrolysis Technique A. El hat*, A. Hadri, C. Nassiri, F.Z. Chafi, B. Fares, N. Hassanain and A. Mzer Équipe des semi-conducteurs et technologie des capteurs d'environnement STCE-Centre de Recherche en Énergie- Mohammed V University, Faculty of Sciences, B.P. 1014, Rabat, Morocco.	H P2.66
16:30	Synthesis and study of electrochemical and spectroscopic properties of a new dye for solar cells based on znO Amina Adala, Mounia Guergouri, Leila Bencharif. University of Brothers Mentouri, Constantine 1. Laboratory: Chemistry of Materials, BP, 325, Ain El Bey Town, Constantine, Algeria, 25017.	H P2.67
16:30	Application of ZTO nanoparticles and porous silicon layer as an antireflection coating for silicon solar cells efficiency increa Malek Atyaoui, Tayssir Ben Amara, and Hatem Ezzaouia Laboratoire des nanostructures, des semi-conducteurs et des technologies avancées, Centre des recherches et des technologies de l'énergie, technopole de Borj-Cédria, PB :95,Hammam Lif 2050, Tunisia	H P2.68
16:30	Abrupt photocurrent generation via electrochemical surface charge-inversion from semi-insulating Sb₂Se₃ photoanodes in water splitting Young Been Kim, Joo Sung Kim, Sung Hyeon Jung, Dong Su Kim, Hyung Koun Cho* School of Advanced Materials Science and Engineering, Sungkyunkwan University, 2066, Seobu-ro, Jangan-gu, Suwon Gyeonggi-do 16419, Republic of Korea	H P2.69
16:30	Formation of metal oxide nanoparticles via submerged photosynthesis Lihua Zhang, Melbert Jeem, Seiichi Watanabe Faculty of Engineering, Hokkaido University, N13, W8, Kita-ku, Sapporo, Hokkaido 0608628, Japan	H P2.70
16:30	Effect of dopants on the photoelectrochemical activity of electrodeposited cuprous oxide films Sung Hyeon Jung, Young Been Kim, Joo Sung Kim, Dong Su Kim, Hyung Koun Cho School of Advanced Materials Science and Engineering, Sungkyunkwan University	H P2.71

Friday 31 may 2019

2d-carbon based Materials : -

08:30	INW Polymeric- and Electronic-Structures of Graphitic Carbon Nitride (g-C₃N₄) Providing Photocatalytic Redox Activities Taizo Sano, * Hiroaki Sato, Tomoko Hori, Tsutomu Hirakawa, Yoshiyuki Teramoto, Kazuhide Koike National Institute of Advanced Industrial Science and Technology (AIST)	H 13.1
09:00	Heteropolyacids supported on C₃N₄ and BN: Comparison between catalytic and photocatalytic alcohol dehydration Francesca Rita Pomilla1,2, Farnaz Fazlali2,3, Elisa I. García-López2, Giuseppe Marci2, Bartolo Megna2, Aida Serrano4, Ali Reza Mahjoub3, Leonardo Palmisano2 1 Department of Environmental and Chemical Engineering, University of Calabria, Via Pietro Bucci, Rende CS, 87036, Italy 2 Dipartimento di Ingegneria, Università di Palermo, Viale delle Scienze, 90128 Palermo, Italy 3 Tarbiat Modares University, Department of Chemistry, 14155-4383 Tehran, Iran 4 Departamento de Electrocerámica, Instituto de Cerámica y Vidrio (ICV), CSIC, 28049 Madrid, Spain	H 13.2
09:15	Pyrene-Functionalized Polymeric Carbon Nitride with Promoted Aqueous-Organic Biphasic Photocatalytic CO₂ Reduction Can Xue, Xuezhong Gong School of Materials Science and Engineering, Nanyang Technological University, Singapore	H 13.3
09:30	TiO₂/ FLG nanocomposites for hydrothermal transformation of cellulosic substrates assisted by photocatalysis Hamza EL MAROUAZI, Izabela JANOWSKA, Valérie KELLER Institut de Chimie et Procédés pour l'Énergie, l'Environnement et la Santé (UMR CNRS 7515), Photocatalysis team, Université de Strasbourg, ECPM, 25 rue Becquerel, 67087 Strasbourg, France	H 13.4
09:45	Enhanced light-to-heat conversion process for water purification using graphene-based nanofluids Francesca Marchetti (1) (2), Nadhira Bensaada Laidani (2), Nicola Ferrari (2), Marina Scarpa (1), Enrico Moser (1) (1) Physics Department University of Trento, Via Sommarive 14, 38123 Povo, Trento, Italy (2) Fondazione Bruno Kessler - Center for Materials and Microsystems, Via Sommarive 18, 38123 Povo, Trento, Italy	H 13.5
10:15	Coffee Break	
Photocatalytic Materials (3) : -		
10:45	A Case Study Showing the Effect of Leaching and Oxidative Etching Using Ag Catalysts S. Neretina, R. A. Hughes, R. D. Neal, S. D. Golze, T. B. Demille University of Notre Dame, College of Engineering, Department of Chemistry and Biochemistry, Notre Dame, IN, USA	H 14.1
11:00	An Analysis of the Factors Determining the Efficiency of Photocurrent Generation in Polymer:Nonfullerene Acceptor Solar Cells Hyojung Cha, James R. Durrant Chemistry, Imperial College London	H 14.2
11:15	Towards novel light harvesting systems based on metal-organic frameworks: investigations from first principle calculations Mariana Kozłowska, Xiaojing Liu, Michael Adams, Ian Howard, Lars Heinke, Wolfgang Wenzel, Christof Wöll Institute of Nanotechnology, Institute of Functional Interfaces, Institute of Microstructure Technology, Karlsruhe Institute of Technology (KIT), 76344 Eggenstein-Leopoldshafen, Germany	H 14.3
11:30	UCNP@SiO₂@ZnO as NIR-based photocatalysts for turbid wastewater treatment David Hu, Ting Cheng, Zhenpeng Cui, Fiorenzo Vetrone, Christophe Colbeau-Justin, Guylène Costentin, Souhir Boujday, Juliette Blanchard D. Hu, Laboratoire de Réactivité de Surface (LRS), Sorbonne Université, Paris, T. Cheng, Institut National de la Recherche Scientifique (INRS), Université du Québec, Varennes, Z. P. Cui, Laboratoire de Chimie Physique (LCP), Université Paris-Sud, Orsay, F. Vetrone, Institut National de la Recherche Scientifique (INRS), Université du Québec, Varennes, C. Colbeau-Justin, Laboratoire de Chimie Physique (LCP), Université Paris-Sud, Orsay, G. Costentin, Laboratoire de Réactivité de Surface (LRS), Sorbonne Université, Paris, S. Boujday, Laboratoire de Réactivité de Surface (LRS), Sorbonne Université, Paris, J. Blanchard, Laboratoire de Réactivité de Surface (LRS), Sorbonne Université, Paris	H 14.4

Heteropolyacids supported on C₃N₄ and BN: Comparison between catalytic and photocatalytic alcohol dehydration

Francesca Rita Pomilla¹, Farnaz Fazlali^{1,2}, Elisa I. García-López¹,
Giuseppe Marci¹, Bartolo Megna¹, Aida Serrano³, Ali Reza Mahjoub², Leonardo Palmisano¹

1 Dipartimento di Ingegneria, Università di Palermo, Viale delle Scienze, 90128 Palermo, Italy

2 Tarbiat Modares University, Department of Chemistry, 14155-4383 Tehran, Iran

3 Departamento de Electrocerámica, Instituto de Cerámica y Vidrio (ICV), CSIC, 28049 Madrid, Spain

Abstract

Catalytic and photocatalytic 2-propanol dehydration to propene by using a continuous (photo)reactor at atmospheric pressure and a temperature range of 70÷120 °C were carried out in gas-solid regime. Propene and diisopropyl ether resulted the main reaction products. The (photo)catalysts were bare and supported Keggin H₃PW₁₂O₄₀ and Wells-Dawson H₆P₂W₁₈O₆₀ heteropolyacids (HPAs). Boron nitride (BN) and carbon nitride (C₃N₄) were used as supports. The HPA species played the key role both in the catalytic and photocatalytic reactions. The acidity of the cluster accounts for the catalytic role, whereas both the acidity and the redox properties of the HPA species were responsible for the increase of the reaction rate in the photo-assisted catalytic reaction. The supported HPAs resulted more active than pristine heteropolyacids. The propene reaction rate increased by irradiating the catalytic system. The Wells-Dawson HPA was more active than the Keggin one both as catalyst and as photocatalyst, as previously observed [1]. The BN support resulted beneficial in comparison to C₃N₄. The apparent activation energy for the catalytic and photocatalytic dehydration has been determined resulting always lower for the photocatalytic process than for the catalytic one.

[1] E. I. García-López et al. Applied Catalysis A:General, 528 (2016) 113-122