



Norway
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Narodowe Centrum
Badań i Rozwoju

Photocatalytic and photoelectrochemical carbon dioxide reduction

PhotoRed



West Pomeranian University of Technology in Szczecin



Zachodniopomorski
Uniwersytet Technologiczny
w Szczecinie



University of South-Eastern Norway



**University of
South-Eastern Norway**



SINTEF AS Industry

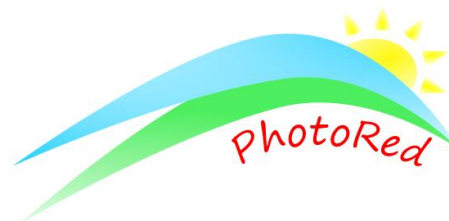


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SINTEF

01.09.2020 – 31.08. 2023



Meeting on 29.10.21 - agenda

- **Introduction**
- **WP1**
 - Dr Chaoqun Cheng – recent results in simulations
 - Prof. Iwona Pelech – recent situation in synthesis issues
- **WP2**
 - Prof. Ewelina Kusiak-Nejman – recent results in samples' characterisation
- **WP3**
 - MSc Katarzyna Ćmielewska – recent results in photocatalysis
- **WP4**
 - Dr Chaoqun Cheng – recent results in photoelectrocatalysis
- **WP5**
 - Dr Anna Lind - recent update in instrumentation and request for catalyst material
- **Next actions**
- **Next meeting**

Introduction

- **3 abstracts at the 17th FNMA (Conference on Functional and Nanostructured Materials) 4-11 September 2021, Paralia Katerinis Greece:**
 - A. Guskos, G. Zolnierkiewicz, S. Glenis, C. Aidinis, P. Berczyński, N. Guskos, E. Kusiak-Nejman, I. Pelech, U. Narkiewicz, A.W. Morawski, Charge transfer in nitrogen-modified titania annealed at 600°C and 650°C, Book of Abstracts, p.35
 - U. Narkiewicz, A. Guskos, G. Zolnierkiewicz, S. Glenis, K. Aidinis, M. Bobrowska, P. Berczynski, N. Guskos, E. Kusiak-Nejman, A. Wanag, I. Pelech, A. Morawski, Magnetic resonance spectra of hybrid nanocomposites containing nanocrystalline TiO₂ and graphene-based materials, Book of Abstracts, p.54
 - G. Zolnierkiewicz, N. Guskos,* A. Guskos, K. Aidinis, S. Glenis, A. Wanag, E. Kusiak-Nejman, U. Narkiewicz, A.W. Morawski, A hysteresis loop and superferromagnetic state in reduced graphene oxide flakes, Book of Abstracts, p.75
- **4th paper published, in *Review on Advanced Materials***
 - N. Guskos, G. Zolnierkiewicz*, A. Guskos, K. Aidinis, S. Glenis, A. Wanag, E. Kusiak-Nejman, U. Narkiewicz, A.W. Morawski, DC magnetization of titania supported on reduced graphene oxide flakes, RAMS 60 (2021) 794-800, <https://doi.org/10.1515/rams-2021-0059>
- **5th paper published in *Materials* on October 28th**
- I. Pelech, D. Sibera, P. Staciwa, E. Kusiak-Nejman, J. Kapica-Kozar, A. Wanag, U. Narkiewicz,* A.W. Morawski, ZnO/Carbon Spheres with Excellent Regenerability for Post-Combustion CO₂ Capture, Materials 14 (2021) 6478, <https://doi.org/10.3390/ma14216478>
- **2nd Polish Patent declared on 25.10.20218.** „Method of selective reduction of carbon dioxide to carbon oxide”, U. Narkiewicz, A.W. Morawski, K. Ćmiełowska, E. Kusiak-Nejman, I. Pelech, P. Staciwa, E. Ekiert, D. Sibera, A. Wanag, M. Gano

Polish Price of Smart Growth'2021

- Received in Toruń on 28th September 2021 during a Forum of the Smart Growth
 - For „The implementation of the project „Photocatalytic and photoelectrochemical reduction of carbon dioxide – PhotoRed”
 - and for a positive attitude about dissemination of scientific research results closer to society.”



Polish Price of Smart Growth'2021

- <https://rzecz.pl/nowatorskie-materialy-przyszlosci/>



Website

- <https://www.photored.zut.edu.pl>
- **Participants' area**
 - **Username:**
 - **Password:**

Deliverables due on August'21

- **M12 (August 2021)**
- D.1.2. Report on the catalysts preparation procedures (WP1)
- **D.2.2 Report on fundamental calculations (WP1)**
- **D.3.1 Report on the characterisation findings of the produced samples (WP2)**

Next action

- **M18 (February 2022)**
- M1 - Procedures for catalyst materials preparation ready (WP1)
- M2 - The selection of the catalyst materials chosen for photocatalytic, photoelectrochemical and environmental assessment completed (WP2)
- D.4. Manuscript on the comparison of properties of the composites of carbon spheres obtained in “one step” synthesis and by wet impregnation (WP2)
- D.5.1 Manuscript on the photocatalytic results (WP3)
- D.6.1 Manuscript on the photoelectrochemical results (WP4).
- D.7. Report on design of up-scaled reactors for photocatalytic and photoelectrochemical processes (WP5).

Next action

- **Exchange of materials:**
 - From WP1 to WP4
 - From WP1 to WP5
 - From WP1 to WP6

Next meeting

- **End of February 2022 – on-line meeting**
- **Middle of May 2022 – physical meeting,**
 - **During „Scandinavian Days” in Szczecin**
 - **and magnolias’ time**

Thank you!



List of attendance

- **Barbara Bay**
- **Richard Blom**
- **Andy Booth**
- **Chaoqun Cheng**
- **Katarzyna Ćmielewska**
- **Ewa Ekiert**
- **Marcin Gano**
- **Joanna Kapica-Kozar**
- **Ewelina Kusiak-Nejman**
- **Anna Lind**
- **Antoni Morawski**
- **Urszula Narkiewicz**
- **Katarzyna Pelka**
- **Iwona Pełech**
- **Kenneth Schneider**
- **Daniel Sibera**
- **Piotr Staciwa**
- **Jacek Trębacz**
- **Kaiying Wang**
- **Kordian Witkowski**