From: Solar2Chem
To: Valenza Roberto
Subject: Solar2Chem 7th Newsletter
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Solar2Chem News

Dear Solar2Chem Friends,

A lot of work has been done for the organization of our next **Solar2Chem Conference** at ICIQ in Tarragona from the 18th to the 22nd of September, registrations are open so don't miss this opportunity! In the last six months, the Solar2Chem project achieved important results: **four scientific articles** were published by researchers of the consortium and a video for the **EU Islands Forum 2023** about islands as policy laboratories and the multi-level perspective on energy transitions was produced. We organized the **Solar2Chem Winter School "Materials and Methods for solar fuels production"** at UPV in Valencia and we attended the **sixth Solar2Chem training workshop** at EPFL about Engineering Devices and Entrepreneurship.
Read more details about these activities in the following sections!

Learn more about our project

Upcoming events

The next six months will be characterized by the international **Solar2Chem conference at ICIQ** in Tarragona. Read below all the details about it. Don't

miss the opportunity to attend!

Solar2Chem Conference at ICIQ (Tarragona)

Join renowned experts from academia, industry, and policy to **explore photo(electro)catalysis, solar fuels, and materials for energy conversion**. With an impressive lineup of international speakers, attendees will have the opportunity to engage in **workshops, roundtable discussions, and networking sessions with industry experts**. Participants are encouraged to present their research through **oral presentations or posters**.

The **Solar2Chem Conference will take place at ICIQ in Tarragona from the 18th to the 22nd of September** will cover areas like photo-electrochemical hydrogen production & CO2/CO reduction, carbon nitrides in photocatalysis, advanced characterization for (photo)-electrochemical systems and modelling and reactor designs for photo-electrochemical systems and much more.

Specific plenary topics will include:
1. Liquid Fuels from Sunlight via Coupled Chemical Microenvironments
2. Sustainable Flow Chemistry in Synthetic Organic Chemistry
3. Photocatalytic water splitting and green hydrogen and fuel production systems
4. Catalysis for green hydrogen production and CO2 conversion
5. EU-wide policy and industry perspective on solar-to-chemical productions

Two scholarships are offered by **Royal Society of Chemistry's Energy Journals** to **fully refund registration fees** with the aim to promote **inclusion** and **empower promising PhD students.** To apply and get the registration fee reimbursed, register for the event and share this Twitter post now!

Register here!

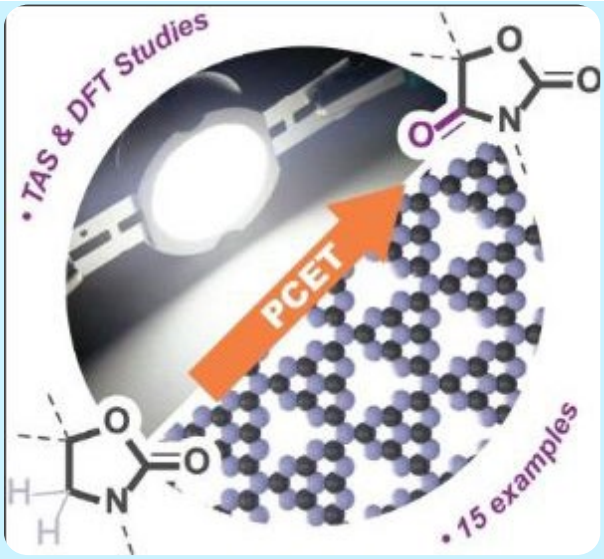
Scientific publications in peer-reviewed journals

Julia T. M. Machado, Prof. Pau Farràs, **Prof. Brendan Flynn** (University of Galway) and **Joshua Williamson** (HyEnergy) published a paper on *Progress in Energy* titled "**Policy supports for the deployment of solar fuels: islands as test-beds for a rapid green transition**". The paper draws on the literature on islands as policy laboratories and the multi-level perspective on energy transitions. The authors argue that particular attention needs to be given to discrete issues such as research and planning, and better synchronizing between emerging local technology niches, the various regulatory regimes for energy, together with global trends.

Alexey Galushchinskiy, Carolina Pulignani and **Horatiu Szalad** published the work "**Heterostructured PHI-PTI/Li+Cl− Carbon Nitrides for Multiple Photocatalytic Applications**" on RRL Solar. The collaboration between Max Planck Institute of Colloids and Interfaces, University of Cambridge and Universitat Politècnica de València focused on two series of novel carbon nitride catalysts obtained via copolymerization of cyanamide and potassium rhodizonate with mixed PTI-PHI composition. The materials were characterized and tested in a number of organic photocatalytic transformations and hydrogen evolution reaction; flow photocatalytic CN-coated sheet cell was assembled to test scalability and recyclability.

Maryam Toufani and a group of researchers from University of Galway lead by **prof. Pau Farràs** published a paper titled "**Exploring the role of different morphologies of β–**Ni(OH)2 for electrocatalytic urea oxidation and the effects of electrochemically active surface area" on *Results in Chemistry*. In this study, different morphologies of β–Ni(OH)2 (nanoflowers, nanocubes, and nanosheets) were prepared and evaluated, with the nanosheet morphology demonstrating superior electrocatalytic performance attributed to its increased exposure of active sites to reactants compared to the nanoflower and nanocube samples.

Alexey Galushchinskiy, **Jokotadeola A. Odutola** and **Pavle Nikačević** worked on an international collaboration between Max Planck Institute of Colloids and Interfaces, Tampere Univeristy, Institut Català d'Investigació Química and Jiaotong University on the paper "**Insights into the Role of Graphitic Carbon Nitride as a Photobase in Proton-Coupled Electron Transfer in (sp3)C−H Oxygenation of Oxazolidinones**" published on *Angewandte Chemie - International Edition.* This paper studied the photocatalytic mechanism involved in the transformation of oxazolidinones to corresponding oxazolidine-2,4-diones with mpg-CN using oxygen as an oxidant. The mechanism was revealed to proceed through proton-coupled electron transfer through a mixture of photocatalytic experiments, transient absorption spectroscopy and DFT calculations.



EU Islands Forum 2023

In the **CE4EUIslands - Mallorca & Tenerife video**, **Julia Machado** (Solar2Chem Early Stage Researcher), **Dr Brendan Flynn** (PhD Supervisor), **Prof. Pau Farras** (Solar2Chem Project Lead) and **Josh Williamson** (project partner - HyEnergy Consultancy) discuss to what extent sufficient policy support exists for solar hydrogen production and how it could be scaled up. The video is connected to their latest publication, which draws on the literature on islands as policy laboratories and the multi-level perspective on energy transitions. The video was submitted to and assessed by the Clean Energy for EU Islands secretariat, and exhibited during the EU Island forum 2023 on the 7th of June at the Views from the islands session (Link).

Solar2Chem Winter School "Materials and Methods for Solar Chemical Production"

The **Solar2Chem Winter School "Materials and Methods for Solar Chemical Production"** took place at the **Universitat Politècnica de València (UPV) from the 22nd to the 24th of February 2023**. The event had **80 attendees** between early-stage and post-doctoral researchers who learnt the new trends of research about solar fuels production, interacted among each other during the networking activities, presented their research at the poster sessions and much more! A summary of the event can be found below.

The Winter School was opened by **Hermenegildo García**, full professor at Instituto de Tecnología Química (ITQ) of UPV, who discussed about photothermal catalysis for CO_2 and N_2 hydrogenation. **Fatwa Abdi** from the Helmholtz-Zentrum Berlin für Materialien und Energie introduced the research of his group about complex metal oxide photoelectrodes for solar fuels and chemical production followed by **Ana Primo Arnau** from UPV who gave a presentation about Mxenes as photocatalysts for water splitting. In the afternoon, the attendees visited the facilities of the laboratories of ITQ. The last talk of the day was given by **Paul Collier**, external programs manager at Johnson Matthey, who presented the possible career paths for researchers in industry and opened the **poster session** in which **48 projects were presented** by the attendees of the school.

The second day was opened by **Markus Antonietti**, director of Max Planck Institute of Colloids and Interfaces, who illustrated the work of his group on new modifications of Carbon nitrides and their use in artificial photosynthesis and single atom support. The presentations of **Elena Mas Marzá** and **Francisco Fabregat-Santiago**, both from Institute of Advanced Materials (INAM) at Universitat Jaume I, about (photo)electrochemical processes beyond water splitting and CO_2 reduction and spectroscopy techniques for the characterization of photoelectrochemical systems and the one of **Laia Francàs Forcada** from Universitat Autònoma de Barcelona about nanoparticles as catalysts for light driven reactions were followed by a roundtable mainly focused on the impact of artificial intelligence in research and development sector. **Emilio Palomares** from Institut Català d'Investigació Química (ICIQ) then showed the research of his group about molecular solar cells moving from dyes to hybrid semiconductors. In the afternoon **Jon Ferrier**, Deputy Editor of EES Catalysis at Royal Society of Chemistry, described how to navigate the publishing process with the Royal Society of Chemistry and opened the second day of poster session, which was dedicated to the competition to **award the best four projects** presented at the school with **prizes from the Royal Society of Chemistry and Johnson Matthey**.

The last day of the school started with a presentation from **Salvador Eslava** from

Imperial College of London about engineering photoelectrochemical and photocatalytic materials for solar fuels. **Kevin Sivula** from École polytechnique fédérale de Lausanne then presented the achievements of his group in the development of organic semiconductors bulk heterojunctions for solar-driven water splitting. **Carlos Martí-Gastaldo** from Instituto de Ciencia Molecular in Universidad de Valencia proceeded with his presentation about homo- and heterometallic titanium-organic frameworks and finally **Antonio Franconetti** from Centro de Investigación Cooperativa en Biociencias concluded the event with his presentation about computational approaches to unravel the structure, interactions and catalytic features in metal-free materials.

Solar2Chem 6th training workshop at EPFL

The Solar2Chem 6th training workshop took place at **École Polytechnique Fédérale de Lausanne (EPFL)** from the 22nd to the 24th of May 2023 and it dealt

with **engineering photoelectrochemical devices and entrepreneurship**.

Prof. Sophia Haussener, leader of the Laboratory of Renewable Energy Science and Engineering (LRESE) at EPFL and host of the workshop, started the workshop showing the work of her group about modelling and engineering of photoelectrochemical reactors at multiple scales. **Prof. Anna Hankin** from the Electrochemical Systems Laboratory at Imperial College then underlined important considerations while up-scaling solar to fuels devices. EPFL alumnus **Dr. Saurabh Tembhurne** presented his company SoHHytech and his entrepreneurial perspective to commercialize solar chemicals. In the afternoon, **Dr. Juliane Sauer** from Oxygeneum lead an interactive session about writing research proposals; Solar2Chem project is almost over and this was the opportunity for the ESRs to learn how to kickstart a scientific career and succeed in proposal-writing. To conclude, the group visited LRESE laboratory facilities and the **world-record solar dish for solar hydrogen production** recently presented on Nature Energy.

The second day of the workshop was dedicated to the presentations of the ESRs, the last moment to share the achieved results before Solar2Chem conference in Tarragona.

The conclusive day was opened by **Prof. Thomas Maschmeyer** from the University of Sidney, which presented examples of successes and failures in the technology translation. **Dr. Huyen Dinh** from the National Renewable Energy Laboratory (NREL) showed the best practices in materials characterization and benchmarking. **Dr. Jelena Stojadinovic** from Membrasenz presented the technology at the base of her start up illustrating membranes in electrochemical cells for production of green hydrogen and green chemicals. **Prof. Mohamed Mamlouk** from the University of Newcastle then gave an overview about challenges and opportunities for renewable ocean fuels. **Dr. Stafford Sheehan** finally concluded narrating the experience of his company Air Co. and how he scaled-up his thermocatalytic reactor for producing sustainable fuels from carbon dioxide, water and renewable electricity.

The last Solar2Chem training workshop was a great success and a lot of lessons about modelling, engineering, scale up and entrepreneurship were learnt from the incredible line up of speakers we had.

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