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Solar2Chem News

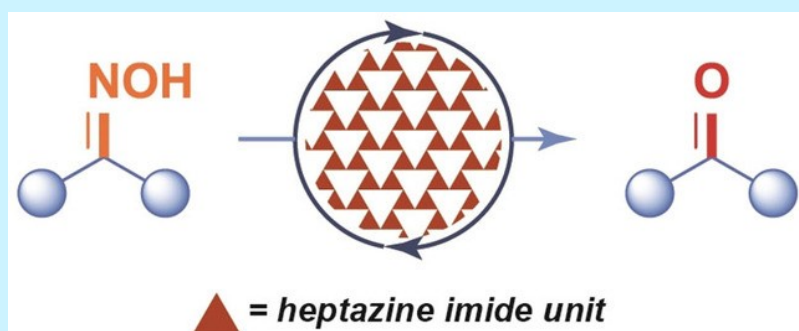
Dear Friends,

The last six months of Solar2Chem project were characterized by important scientific achievements: **three scientific articles** were published by researchers of the consortium. We also co-organized the **Solar2Chem x Seafuel symposium** in Tenerife in which we discussed with other researchers, industrial partners and policy makers about production of fuels from solar energy, we visited Tampere University for the **fourth Solar2Chem training workshop** about photochemistry and intellectual property management and we participated to the **European Green Week 2022** to present some of the last results of our project to a wider audience. Read more details about these activities in the following sections!

[Learn more about our project](#)

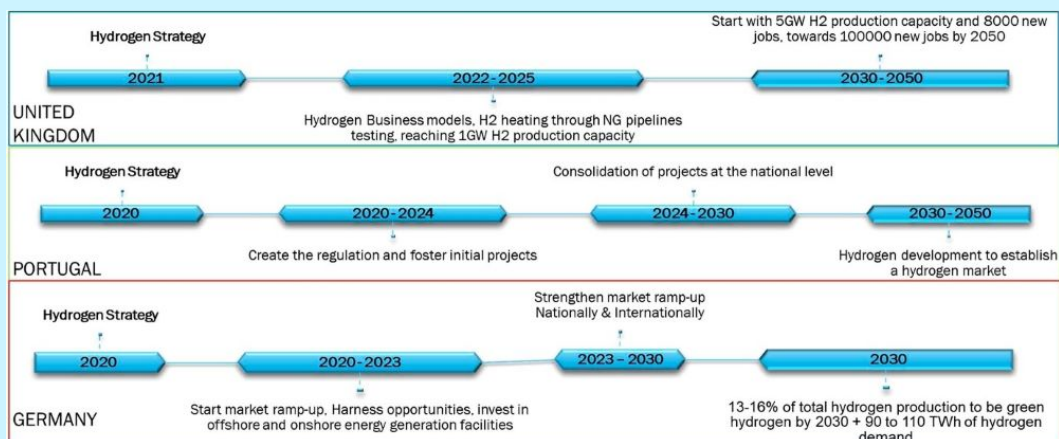
Scientific publications in peer-reviewed journals

Alexey Galushchinskiy and a group of researchers in Max Planck Institute for Colloids and Interfaces lead by **Dr. Aleksandr Savateev** studied oxime-to-carbonyl conversion by poly(heptazine imide)-photocatalyzed singlet oxygen generation. Further details can be found in the open access article "[Insights Into the Mechanism of Energy Transfer with Poly\(Heptazine Imide\)s in a Deoxygenation Reaction](#)" on *ChemPhotoChem*.



Alexey Galushchinskiy and **Dr. Aleksandr Savateev** together with Solar2Chem project coordinator **Dr. Pau Farràs** and other researchers from NUI Galway contributed to a review which is a summary of photocatalytic and photoelectrocatalytic processes using natural outdoor solar light for the synthesis of bulk commodities such as solvents and fuels, as well as chemicals for niche applications. An overview of photoreactors on a larger scale is also provided. The full vision of the impact of this area of research on society and the economy offered by the authors can be found in the article "[Progress in Development of Photocatalytic Processes for Synthesis of Fuels and Organic Compounds under Outdoor Solar Light](#)" on *Energy & Fuels*.

Júlia T. M. Machado, her supervisor Dr. Brendan Flynn from National University of Ireland Galway and her co-supervisor Ian Williamson from HyEnergy Consulting performed a comparative analysis of three European national hydrogen strategies, offering a contrast between Germany, the United Kingdom and Portugal. To interpret these strategies, they employed the Multi-Level Perspective on energy transitions, which focuses on how different actors have a variable influence at mutually reinforcing levels of policymaking (niches, regime and landscape). These include EU institutions, national governments and agencies, energy and technology firms, research networks. The full open access article "[The national shaping of Europe's emerging hydrogen strategies: Cooperative or competitive hydrogen Politics?](#)" can be read on *Competition and Regulation in Network Industries*.



Solar2Chem X Seafuel Symposium in Tenerife

The ESRs of Solar2Chem were active part of the organization of the event “**Hydrogen Islands, opportunities and challenges**” together with **Seafuel project** and the **Hydrogen Triple Alliance**. The first day of the event was an opportunity to hear from presentations from policy makers, companies working in the energy sector and local entrepreneurs about the role that hydrogen can have in the clean energy transition in islands. The second day was dedicated to the visit of the **Seafuel hydrogen refuelling station** placed at the Institute of Technology and Renewable Energies (ITER) of Tenerife, an opportunity to see an example of technology scale-up to industrial levels.



The third day was instead dedicated to the **Solar2Chem x Seafuel symposium** about technologies for the conversion of solar power into fuels organized by our ESRs. The event was in hybrid format, with the majority of speakers connected online but it was anyway a unique opportunity to discuss about the last scientific achievements in the (photo)electrocatalytic production of fuels.

The event started with the introduction of Solar2Chem project by **Jokotadeola Odutola** and **Sebastiano Gadolini** (picture below). Then **Horatiu Szalad** moderated the morning session where **prof. Alexander Cowan** had a speech on the electrocatalytic reduction of carbon dioxide going from molecules to materials, then **prof. Gabriele Centi** presented the SUNERGY initiative and how solar to chemical energy storage can be a crucial technology for islands. Afterwards, the conversation focused on the scale-up of solar fuels technologies: **prof. Adélio Mendes** reported the last achievements in the design of photoelectrochemical devices; **dr. Fatwa Abdi** underlined the scientific pathways towards large-scale implementation of solar water splitting devices. To conclude, **Francesca Lorenzutti** guided the conversation of the round table with the first four speakers in which the possibilities of scaling up solar-driven electrochemical processes for the production of fuels to industrial level were analysed.

In the afternoon, **Kathrin Naumann** took the lead in the moderation of the new session where **prof. Sophia Haussener** described the photoelectrochemical devices designed to work with concentrated radiation and the innovative patented devices for the production of fuels from (photo)electrochemical water splitting of the companies Sunrgize and Enapter were presented by **dr. Luis Villalba** and **dr. Gaia Neri**, respectively. **Dr. Brendan Flynn** finally discussed about the European strategy in the development of policies for a transition to a hydrogen economy.



4th Solar2Chem training workshop in Tampere

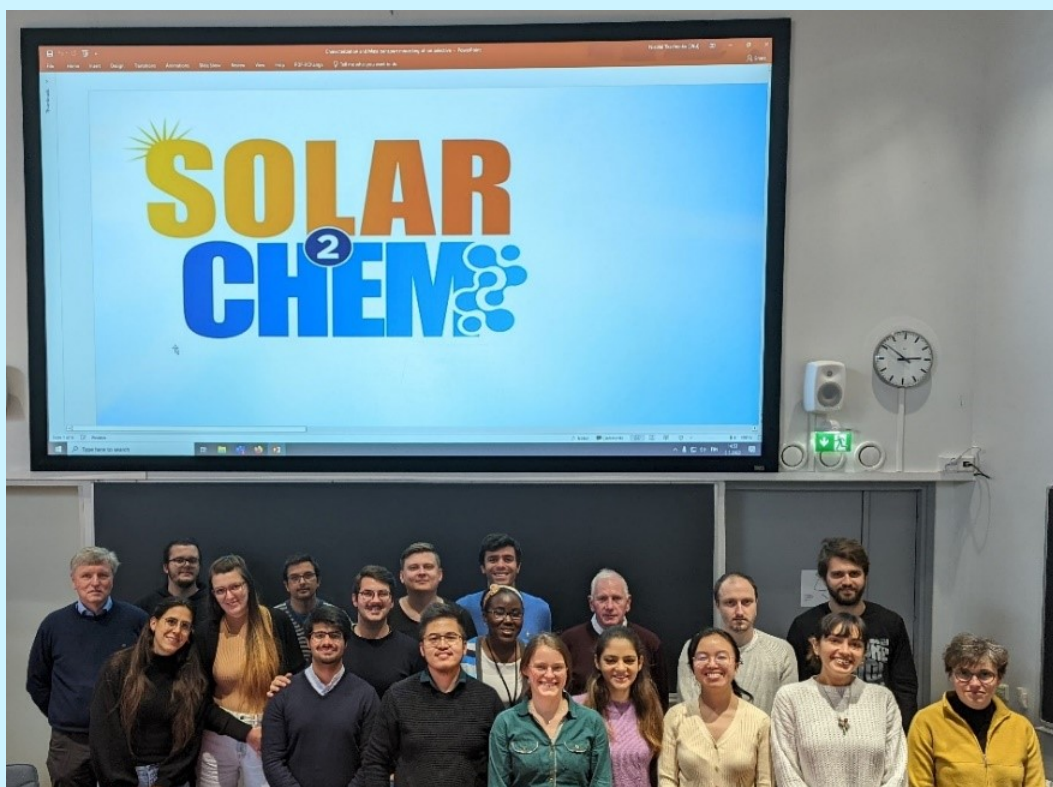
The 4th Solar2Chem Training Workshop about Photophysics and Intellectual property management was organized by Tampere University from the 3rd to the 6th of May 2022. It was organised as a “hybrid” workshop with a mixture of both in person and online speakers.

On the first day, **prof. Nikolai Tkachenko** presented the principles of photochemistry in molecules and materials and he showed to the ESRs and the attendees of the workshop the laboratories of the university. **Prof. Anthony Harriman** from Newcastle University then explained in his lecture how fast spectroscopy can unravel reaction mechanisms and finally **dr. Helena Stojadinovic** presented how to protect ideas with intellectual property (IP) management strategies reporting the example of her startup Membrasenz.

The second day of the workshop started with the intermediate presentations of the ESRs of Solar2Chem work packages 1 and 4. Then, **dr. Thomas Vranken** from Hasselt University presented strategies to obtain funding for scientific conferences and, to conclude, **prof. Paola Vivo** of Tampere University explained the theory of perovskite solar cells and the last achievements of this technology.


The presentation of the ESRs from work packages 2 and 3 animated the morning of the third day, they were followed by a presentation of **Chris Hotchen** from Johnson Matthey about the fundamentals in IP management in academic and non-academic institutions. **Dr. Gergely Samu** (Szeged University) then had a lecture about semiconductor stability in photoelectrochemical cells and **dr. Eugenia Martinez** (ICIQ) presented how to study photocatalytic interfaces using photophysical measurements.

To conclude the workshop, on Friday **dr. Annamaria Quaranta** (CEA) reported the recent achievements in catalysts for artificial photosynthesis, **dr. Reshma Rao** (Imperial College) presented the advanced spectroscopy technologies to study photoelectrochemical reactions in operando, **dr. Jose Silva Lopes** (NOVA School of Science and Technology) explained the pathways to perform the transition of renewable energy technologies to the market. The afternoon was then dedicated to the two hands-on exercises in the laboratories about singlet intramolecular electron transfer and quenching of eosin Y triplet state by oxygen.




European Green Week 2022

Júlia Machado and Horatiu Szalad participated to the event “Towards the implementation of the EU Green Deal through the production of sustainable fuels and chemicals” organized by SunCoChem project for the European Green Week 2022. The participation to the online event was an occasion to present an overview of Solar2Chem project and the last scientific results about the photothermal reduction of CO₂.



Horati...

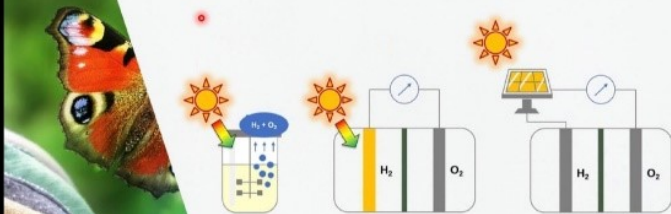


Júlia...

Integrating Photo-assisted technologies for the conversion of Valuable Chemicals with the EU Green Future

SOLAR² CHEM

Solar2Chem ITN MSCA Project



Photocatalysis (PC)

- RedOx catalysis
- Organic transformations / degradation
- **Hydrogen production**

Photothermal catalysis

- CO₂ hydrogenation
- N₂ fixation

Photoelectrocatalysis (PEC)

- Artificial photosynthesis, water splitting
- Solar chemicals (methanol, ammonia, etc.)
- **Hydrogen production**

S. Chu, et al. *Nano Futures*, 2017, 1, 022001

Products:
AMMONIA, HYDROGEN PEROXIDE, HYDROGEN, CO, HYDROCARBONS, ETHANOL AND HIGHER ALCOHOLS, HIGH VALUE ORGANIC MOLECULES

EU GREEN WEEK PARTNER EVENT

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie-Sklodowska-Curie grant agreement No. 861151.

Upcoming events

1. **Solar2Chem 5th Training Workshop in December 2022** in **Cambridge University**, United Kingdom.
2. **Solar2Chem Spring school (20-23 February 2023)** in **Universidad Politécnica de Valencia**.
3. **Solar2Chem final conference (18-23 September 2023)** in **ICIQ (Tarragona)** with invited international experts of the solar fuels community and open to every researcher interested. Updates about the events will be communicated soon!



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