

DFG

Joint Call “Solar-Driven Chemistry”





A network of research councils for the development and implementation of joint bottom-up European programmes for curiosity driven research

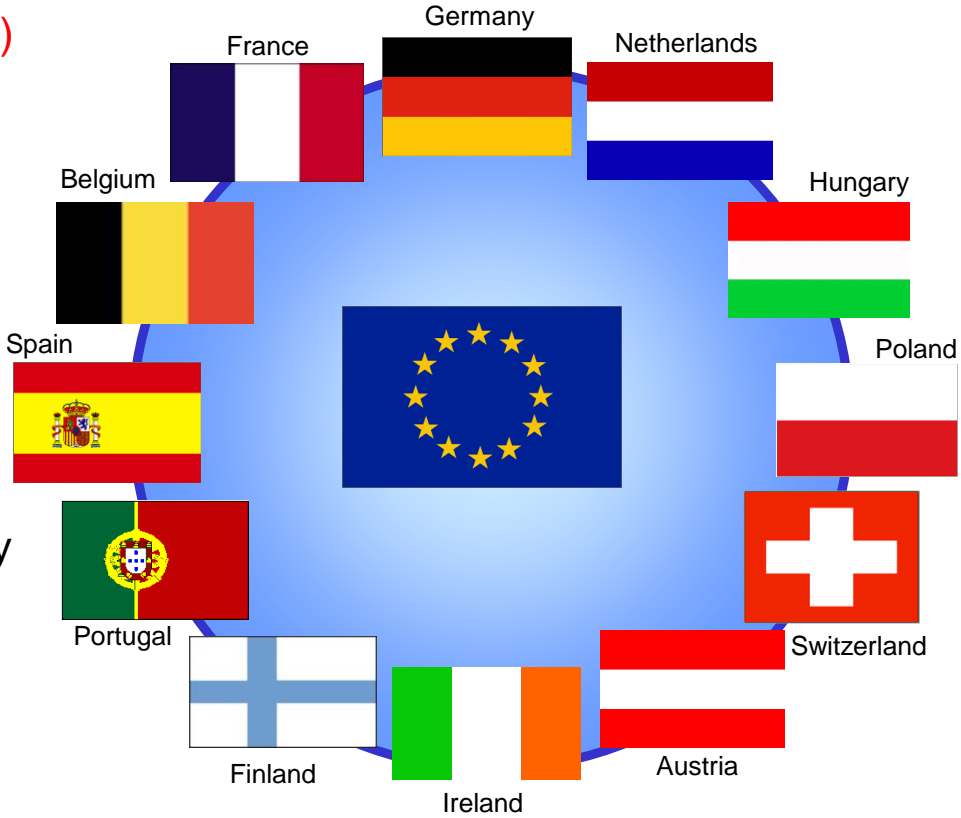
HISTORY

Initiated by members of CERC3 and funded within the ERA-Net programme of the European Commission

January 2004 - December 2008 (EC funding)

14 full partners
from
12 countries

Since 2009 – continuation of ERA-Chemistry with national resources –
Moving towards a sustainable network



Decision-Making & Examples of funding joint collaboration

Multilateral Calls: Open Initiative

Year	Partners	Pre-proposals	Proposals	Grants	Grant Budget / €	Invitation rate / %	Funding rate / %
2008	7	97	41	10	3,173,798 €	42.3	24.4
2009	7	50	26	8	2,983,481 €	52.0	30.8
2010	6	71	26	7	2,405,681 €	36.6	26.9
2011	3	38	20	6	1,863,820 €	52.6	30.0
2012	3	26	11	4	1,975,936 €	42.3	36.4
2013	3	49	19	5	1,618,000 €	38.8	26.3

Next Call to be launched on

15 December 2014

if a sufficient number of Partner organisations decides to participate.

www.erachemistry.net & DFG Newsletter



Follow up activities

Triggered mainly by EuCheMS

- ▶ 12 November 2013: Meeting in Brussels, result: Most partners are more interested in **thematic calls** instead of unsolicited (open) calls

International Activities in Solar-Driven Chemistry

Some examples

- CS3 Symposia „Powering the World with Sunlight“ 2009 und 2017

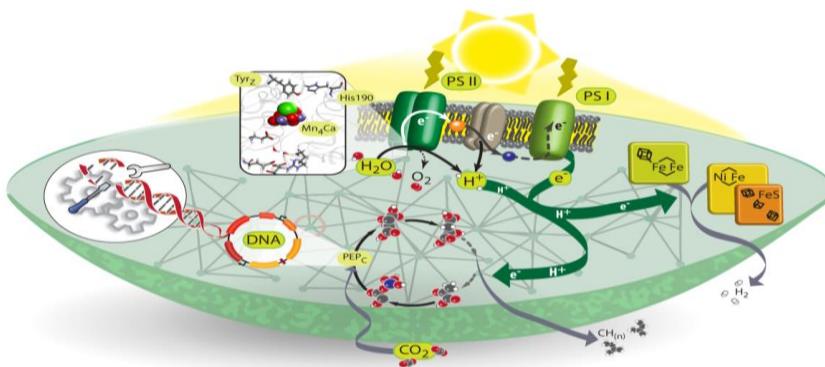
www.rsc.org/suppdata/ee/b9/b924940k/b924940k.pdf

- EC Report „Artificial Photosynthesis: Potential and Reality“

<https://publications.europa.eu/en/publication-detail/-/publication/96af5cc3-2bd6-11e7-9412-01aa75ed71a1/language-en>

- FET-Flagship „Sunrise: Solar Energy for a Circular Economy“ (Initiative by Huub de Groot, NL)

www.sunriseflagship.eu



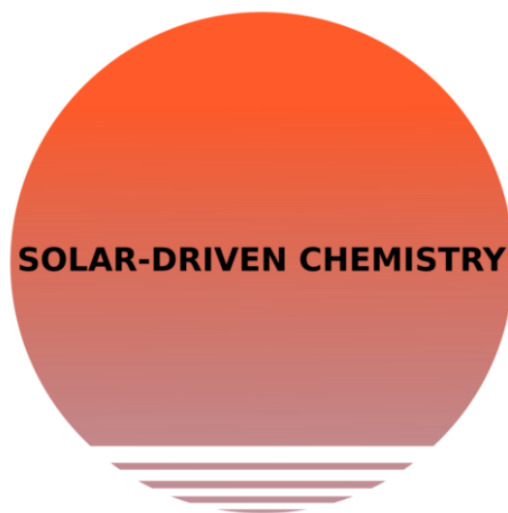
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- ▶ 12 November 2013: Meeting in Brussels, result: Most partners are more interested in **thematic calls** instead of unsolicited (open) calls
- ▶ 9 October 2015: Meeting in Berlin. Scientists working in the field of **solar driven chemistry**. Result: **Whitepaper**

Solar-driven Chemistry

Whitepaper



<https://www.euchems.eu/solar-driven-chemistry/>

Solar-Driven Chemistry –

Today, the EuChemS and DFG “Solar-Driven Chemistry” white paper was launched during at the ECC6 by Ulrich Schul EuChemS Vice-President and one of the authors of the paper.

The objective of this White Paper is to show that it is possible, and even necessary, to drive chemical reactions by the energy from the sun in order to guarantee the welfare of future generations.

Solar-driven chemistry is a visionary concept, for which many scientific and technical problems still have to be solved. Transfer from basic chemical research to industrial applications usually takes 20 to 30 years. However, intermediate short- and medium-term objectives, which are necessary to enable the long-term goal, can also generate new knowledge, which will provide wider benefits to society and an improvement of the industrial competitiveness.

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- ▶ 9 October 2015: Meeting in Berlin. Scientists working in the field of **solar driven chemistry**. Result: **Whitepaper**
- ▶ 16 October 2017: Meeting of National Funders in Brussels, result: Preparation of a **call** in the field of Solar driven Chemistry
- ▶ 24 April 2018: Meeting of National Funders in Rome, result: **Call text** and **call procedure**

Solar-driven Chemistry

Call text

In natural photosynthesis, carbon dioxide is converted into complex chemical compounds by using sun-light (photons) as the energy source. Solar energy is thus stored in chemical bonds. Developing technical processes for the direct conversion of solar energy into chemical compounds by means of artificial compounds, using universally available raw materials such as carbon dioxide and/or water, is a scientific and technical "grand challenge" with tremendous societal impact. Such an approach does not rely on low-carbon electricity from traditional or renewable energy sources, as the photons arriving at the earth are directly used for (photo-)chemical processes, and no intermediate storage or transfer of electricity is needed.

Although the topic is not new and feasibility of several solar-driven chemical approaches has been demonstrated on a laboratory scale, this is still a visionary goal where many fundamental scientific questions have to be answered before it can be implemented on a meaningful technical scale along the value chain. Non-exclusive examples of associated fundamental research for the photochemical conversion of small molecules into valuable products are: development and improvement of methods and materials for light harvesting and stable (photo-)catalysts, both based on commonly available raw materials, development of analytical, theoretical and computational tools to understand the thermodynamics and to predict the reactivity of such materials, understanding of energy transfer and conversion processes in de novo designed man-made organic and inorganic materials, etc.

https://www.dfg.de/foerderung/info_wissenschaft/2018/info_wissenschaft_18_94/

Content of the call

What is included?

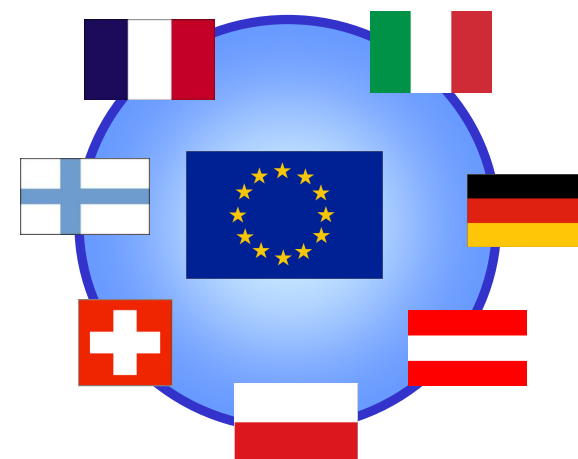
- ▶ Research on light-converting/harvesting, catalytic, electrode, membrane, etc. materials
- ▶ Materials issues (e.g. photochemical stability of relevant materials), as long as they are used for the photochemical conversion of small molecules
- ▶ Investigating mechanisms of catalysis and light harvesting, if focus is on photochemical conversion of small molecules
- ▶ Heterogeneous photoelectrochemistry/photocatalysis
- ▶ Photocatalytic water splitting
- ▶ Photochemical or photoelectrochemical CO₂ reduction
- ▶ Development of new photoactive systems if related to the general call topic
- ▶ Reaction engineering
- ▶ Molecular model systems capable of direct conversion, e.g. for mechanistic studies

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Call „Solar-Driven Chemistry“

Realisation

- ▶ Participants:
 - ANR (France), DFG (Germany), NCN (Poland), SNSF (Switzerland), AKA (Finland)
- ▶ Boundary conditions:
 - Two to four applicants from at least two countries
- ▶ Approach:
 - Two-step review procedure; preproposals and full proposals
- ▶ Budget:
 - 5.5 Mio. € for all five partner organisations
- ▶ Review:
 - International Review Board: 12 people; external expertise for full proposals
- ▶ Formal decision and funding:
 - Respective national research councils



ERA-Net without EC funding

Solar-driven Chemistry

Call schedule

- ▶ 24 April 2018: Meeting of National Funders in Rome, result: **Call text** and **call procedure**
- ▶ 12 December 2018: **Call published**
- ▶ 13 February 2019: **Deadline for pre-proposals**, 47 pre-proposals received
- ▶ 14 June 2019: **Decision** on pre-proposals, 20 full proposals invited
- ▶ 31 July 2019: **Deadline for full proposals**
- ▶ 15 November 2019: Full proposal review, about 9 groups to be suggested for funding
- ▶ Until March 2020: Decision and start of projects

Solar-driven Chemistry

Future activities

- ▶ Next call December 2020
- ▶ Important subject
- ▶ Practicable procedure, independent from EC, independent decisions on national level
- ▶ More European partners
- ▶ Next meeting February 2020 in Berlin
- ▶ Please subscribe to circulating email list!



Thank you!

Whitepaper:

<https://www.euchems.eu/solar-driven-chemistry/>

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