

Postdoctoral position (up to 24 months)

Photocatalysts based on Earth-abundant metals: towards a sustainable production of solar hydrogen

– SunHy –

In an attempt to fight against climate change and global warming, our global carbon footprint must be reduced to a minimum. In this context, fuel cells are booming again, especially in long-range auto-mobility, since zero CO₂ emissions are produced. However, the sustainable and efficient production of hydrogen and oxygen is still an open question and remains a major long-term endeavor. As for the former, it is mostly produced from fossil resources such as natural gas or coal, but also from water electrolysis that uses non-renewable electricity.

To tackle this problem, the SunHy project aims at developing efficient low-cost photoactive systems based on photocatalytic proton reduction by mimicking Nature's approach in leaves. In particular, we target **metalorganic photo-systems bearing only Earth-abundant elements such as iron and cobalt** for light-harvesting and redox catalysis, respectively. While the proof-of-concept has been demonstrated, the catalytic properties are rather low.¹ Therefore, the main goals of this project are both *understanding and improving the working principle of these photocatalysts*.

The SunHy project will be developed within an **ANR French-German consortium** with complementary recognized expertise from chemical design and synthesis to characterization techniques, notably advanced ultrafast spectroscopies. The consortium involves 4 partners: 1) C. Cebrián and P. Gros (L2CM, University of Lorraine); 2) S. Haacke (IPCMS, University of Strasbourg); 3) M. Bauer (University of Paderborn); 4) K. Heyne and J. L. Pérez Lustres (Free University of Berlin).

Job description

Capitalizing on our experience with Fe^{II} photosensitizers,² this postdoctoral position will be focused on the preparation of ligands and photoactive iron complexes, together with their ground-state characterization. Thus, the candidate should be a talented organic/organometallic chemist, willing to work in a multidisciplinary cooperative environment and with good communications skills in English. Additional knowledge of photophysics would be appreciated (although it is not required).

The duration of the contract will be of 12 months, with the possibility of an extension of up to 24 months. The research work will be carried out mostly at the L2CM (Univ. Lorraine), but short stays within another partner's laboratory might be envisaged as well.

Interested in applying?

Please go to: <https://bit.ly/3ARz2I9>

→ Deadline for applications: February 22nd 2022.

→ Expected starting date: April 2022, with some flexibility on the exact starting date.

For further questions, you can send an email to Cristina Cebrián Ávila (cristina.cebrian-avila@univ-lorraine.fr).

¹ a) P. Zimmer *et al.*, *Eur. J. Inorg. Chem.* **2018**, 5203–5214; b) M. Huber-Gedert *et al.*, *Chem. Eur. J.* **2021**, 27, 9905–9918.

² a) K. Magra *et al.* *Eur. J. Inorg. Chem.* **2021**, DOI : 10.1002/ejic.202100818 ; b) A. R. Marri *et al.*, *Chem. Eur. J.* **2021**, 27, 16260–16269.