

## Postdoctoral Position in Organic/Organometallic Chemistry (1 year)

### Visible-Light Activation of Polymeric Actuators

**Workplace :** SAMS group at the Institut Charles Sadron (ICS).

**Expected starting date :** 01/12/2024.

**Experience required :** Less than 3 years since the PhD defence.

**Application deadline:** The selection process ends once a suitable candidate is selected.

#### Context and research project

In the search for advanced functional materials, one of the most promising strategies is to encode the target functionalities at the molecular level, which can be transposed to the macroscopic level by means of appropriate supramolecular organisations. Nowadays, one of the most innovative concepts in this field deals with the use of molecular machines capable of producing mechanical work in response to different external energy sources, like the protein engines essential to the functioning of living systems. In this context, our group (SAMS, directed by Prof. N. Giuseppone) recently demonstrated that the continuous unidirectional rotation of molecular motors[1] under light irradiation can be amplified at different scales, resulting in a modulation of the mechanical properties of the materials in which they are incorporated.[2] The exploitation of these properties allowed the preparation of artificial muscles,[3] the manipulation of the response of human immune cells by mechanotransduction,[4] or the acceleration of ion transport through phospholipid membranes,[5] among others.

A current limitation to this approach is that most of these molecular motors are activated by UV light, with wavelengths within the 350-400 nm range. As part of an IdEx 2024 funding from the University of Strasbourg, this project aims to explore visible light activation strategies for molecular motors integrated in smart materials, with a special focus devoted to photoactive organometallic systems. The postdoctoral position will therefore focus on the synthesis and characterisation of such organometallic compounds, together with the preparation of subsequent hybrid light-responsive polymer materials.

[1] M. Baroncini, S. Silvi, A. Credi, *Chem. Rev.* **2020**, *120*, 200–268. [2] Q. Li, G. Fuks, E. Moulin, M. Maaloum, M. Rawiso, I. Kubic, J. T. Foy, N. Giuseppone, *Nat. Nanotechnol.* **2015**, *10*, 161–165. [3] A. Perrot, W. Wang, E. Buhler, E. Moulin, N. Giuseppone, *Angew. Chem. Int. Ed.* **2023**, *62*, e202300263. [4] W.-Z. Wang, L.-B. Huang, S.-P. Zheng, E. Moulin, O. Gavati, M. Barboiu, N. Giuseppone, *J. Am. Chem. Soc.* **2021**, *143*, 15653–15660. [5] Y. Zheng, M. K. L. Han, R. Zhao, J. Blass, J. Zhang, D. W. Zhou, J.-R. Colard-Itté, D. Dattler, A. Çolak, M. Hoth, A. J. García, B. Qu, R. Bennewitz, N. Giuseppone, A. del Campo, *Nat. Commun.* **2021**, *12*, 3580.

#### Job requirements

We are looking for a **highly motivated, rigorous and team-spirited candidate, with good communications skills (both oral and written) in English**. The ideal candidate must hold a PhD in molecular chemistry with a **solid knowledge and practical experience in organic and organometallic synthesis**. Additional knowledge of photophysics and/or (nano)materials science will be appreciated. Short stays in other laboratories for characterisation measurements might be envisaged.

#### Host laboratory

The SAMS research group ([link](#)) occupies a predominant position in the field of supramolecular chemistry, ranging from self-assembled polymers to dynamic combinatorial chemistry and, more recently, to molecular machines and motors. In particular for the latter, the significant progress achieved by the team has allowed to obtain several major European grants (ERC, FET-Open and several MSCA) with a network of world-renowned collaborators (including 4 Nobel Prize winners).

The SAMS group is part of the Institute Charles Sadron (ICS), which is a CNRS laboratory (UPR 22) associated with the University of Strasbourg (Unistra) and the National Institute of Applied Sciences of Strasbourg (INSA). This multidisciplinary unit covers topics such as molecular and supramolecular chemistry, physico-chemistry and materials physics (including polymers), as well as self-assembled systems. Thus, the recruited postdoctoral researcher will benefit from a highly stimulating scientific environment within a project at the crossroads between molecular and supramolecular chemistry, and materials science.

### Interested in applying?

Applications should be sent to Cristina Cebrián Ávila ([ccebrianavila@unistra.fr](mailto:ccebrianavila@unistra.fr)) and should include:

- a detailed CV with the list of publications;
- a cover letter;
- a short research report;
- two letters of recommendation directly sent to Cristina Cebrián Ávila or, alternatively, the contact details of the two referees.