

## Post-doctoral position in molecular chemistry – TRANSCEND project

### *Synthesis and Study of Near-Infrared Organic Dyes for the Elaboration of Transparent and Colorless Solar Cells*

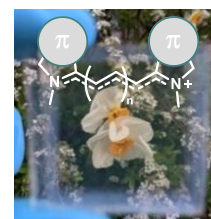
<b>Laboratory</b>	Chimie Et Interdisciplinarité, Synthèse, Analyse, Modélisation (CEISAM) UMR CNRS 6230 - Nantes University - France
<b>Supervision</b>	Dr. Simon Pascal
<b>Starting Date / Contract</b>	ca. Nov.-Dec. 2024 / 12-months contract (extendable)
<b>Salary</b>	from 3020 to 4200 € monthly gross salary

*Deadline:*  
Sept., 23<sup>rd</sup>  
2025

#### About the project

In view of the inevitable climate change, the production of energy from sustainable and renewable resources is a major challenge of the coming decades. A significant amount of energy is received by the planet via solar radiation, which constitutes an almost infinite natural resource once converted into electricity using photovoltaic devices. Currently, the majority of devices based on dye-sensitized solar cells (DSSCs) or organic photovoltaics mainly capture light in the visible range, while a non-negligible proportion of radiation is found in the near-infrared (NIR). This program is part of the breakthrough field of colorless, transparent photovoltaic cells. Efficient photovoltaic technology in the NIR would enable the development of colorless, transparent solar panels that could be integrated into the glazing of buildings, vehicles, greenhouses and autonomous portable devices.<sup>1</sup> For this application, DSSCs are among the most promising devices, as they are simple to implement while offering competitive electricity production over the long term.<sup>2</sup> In this context, the aim is to develop NIR-selective photosensitizers, which is precisely the subject of the present postdoc offer.

The TRANSCEND project, funded by the *Pays de la Loire* region, *Nantes Métropole* and the *CNRS*, capitalizes our group's expertise and recent results in the fields of NIR dyes and colorless DSSCs.<sup>3</sup> More concretely, it aims to design organic dyes belonging to the polymethine family, which absorb intensely and specifically in the NIR region,<sup>4</sup> for the development of transparent solar cells. **The research is interdisciplinary and particularly challenging: the postdoctoral candidate will develop the synthesis and purification of innovative NIR organic dyes, unravel their photophysical and electrochemical properties, and integrate them in a new generation of transparent solar cells developed in our group.**



Photograph of a transparent colorless NIR-selective DSSC and general scheme of a polymethine dye.

#### References:

1. C. J. Traverse, R. Pandey, M. C. Barr, R. R. Lunt, *Nat. Energy*, **2017**, 2, 849.
2. (a) W. Naim, V. Novelli, I. Nikolinakos, N. Barbero, I. Dzeba, F. Grifoni, Y. Ren, T. Alnasser, A. Velardo, R. Borrelli, S. Haacke, S. M. Zakeeruddin, M. Graetzel, C. Barolo, F. Sauvage, *JACS Au*, **2021**, 1, 409; (b) F. Grifoni, M. Bonomo, W. Naim, N. Barbero, T. Alnasser, I. Dzeba, M. Giordano, A. Tsaturyan, M. Urbani, T. Torres, C. Barolo, F. Sauvage, *Adv. Energy Mater.*, **2021**, 11, 2101598.
3. (a) T. Baron, W. Naim, I. Nikolinakos, B. Andrin, Y. Pellegrin, D. Jacquemin, S. Haacke, F. Sauvage and F. Odobel, *Angew. Chem. Int. Ed.*, **2022**, 61, e202207459; (b) T. Baron; W. Naim; M. Kurucz; I. Nikolinakos; B. Andrin; Y. Pellegrin; D. Jacquemin; S. Haacke; F. Sauvage; F. Odobel, *J. Mater. Chem. A*, **2023**, 11.
4. Our recent review related to polymethine dyes: B. Mouro, D. Jacquemin, O. Siri, S. Pascal, *Chem. Rec.* **2024**, e202400183.

#### Working environment

The **CEISAM** lab federates research activities in the field of molecular chemistry in Nantes. Within the unit, the IMF team (Functional Materials Engineering) has all the equipment required for designing and characterizing molecules, as well as integrating them into solar devices. **Nantes** is a dynamic city with a cultural and gastronomic focus, and is a forerunner in terms of ecological transition, offering a quality of life that is unique in France.

#### Candidate profile

The candidate should hold a recent PhD in Chemistry, and have a strong background in organic synthesis, as well as knowledge in spectroscopic and electrochemical characterization techniques. Previous experiences in the fields of chromophores or organic electronics would be highly appreciated, but are not mandatory.

#### How to apply?

All applications (CV + cover letter) must be submitted via the dedicated platform on the CNRS website:

<https://emploi.cnrs.fr/Offres/CDD/UMR6230-SIMPAS-004/Default.aspx?lang=EN>