



University of Strasbourg Institute for Advanced Science (USIAS) postdoctoral position (1 year) - Institute Charles Sadron (Strasbourg, France)

We are looking for highly motivated scientists to work in a multidisciplinary project involving supramolecular chemistry, supramolecular chirality, organic electronics and spin dynamics in collaboration with the group of Prof. Shu Seki (Kyoto University, Japan)

Short description of the project: <https://www.usias.fr/en/fellows/fellows-2020/amparo-ruiz-carratero-shu-seki/>

One of the main challenges of our generation is finding sustainable energy sources that meet the increasing energy demand. Solar energy is a promising solution since it is clean, cheap and accessible. Organic solar cells can be fabricated at low energy cost, even though they still present issues that need to be addressed. The project proposes to enhance the energy efficiency of solar cells by reducing charge recombination, which is a frequently occurring phenomenon in organic photovoltaic devices. When charge carriers are created upon light illumination they frequently fail to be efficiently transported, and therefore do not contribute to the performance of the photovoltaic device. To do so, the aim is to explore supramolecular chiral semiconductors, where a preferred spin can be transmitted through a determined handedness structure.

This phenomenon has been recently described as the chiral-induced spin selectivity (CISS) effect. The aim of the project is to study the CISS effect by employing a fast screening method that does not require the fabrication of entire photovoltaic devices. A combined technique joining contactless microwave spectroscopy and electron paramagnetic resonance, pioneered by Professor Seki, will be used to perform full characterisation of spin states and charge carrier transport in simple thin films made of supramolecular chiral materials. Once the team has a good understanding of how molecular and supramolecular structure relates to the CISS effect, they can provide handles to the photovoltaics community to obtain superior devices. With an approach that uses chiral supramolecular fibres, Dr. Ruiz Carretero and Professor Seki foresee that the electrons and holes are efficiently transported after exciton splitting. In addition, they propose to accelerate the optimisation of the CISS effect in chiral assemblies by employing a rapid screening technique.

Application deadline: **15/01/2021**

Expected starting date: can be discussed, preferably March 2022

Requirements: having a PhD

Main background: Organic chemistry

Preferred skills: Supramolecular chemistry, self-assembly, spectroscopy, organic electronics background

Applications should be submitted to Amparo Ruiz Carretero: ruizcarretero@unistra.fr, including a CV and contact details of two referees. A motivation letter is optional.