

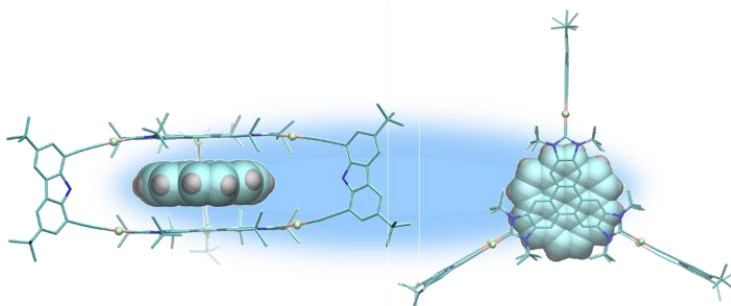
3-year (FPI) PhD-fellowship

Supramolecular Organometallic Structures for Catalysis and Molecular Recognition (SUPRACAT)

Ref.: GRISOLIAP/2020/050

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Project Summary: Functional structures in nature often assemble with high geometric precision from libraries of different building blocks. The rational design of programmed artificial supramolecular architectures depends on how to control the



sequence and position of the building blocks in the final assemblies. The application of the general principles and stereoelectronic preferences of metal ions combined with rigid multidentate ligands has allowed the rational design of a wide range of highly symmetric architectures. Supramolecular coordination complexes (SCCs) are often referred to as "molecular flasks", because they show well-defined nanoscopic cavities. It is precisely the presence of such cavities that provides

SCCs with important applications in catalysis, molecular recognition, for the stabilization of highly reactive species, and as drug delivery/release vectors. Over the last few years, we designed a wide variety of mono- di- and tri-NHC-based ligands bearing rigid polycyclic aromatic functionalities, thus we now have access to a wide library of scaffolds that can be used for the preparation of a large number of organometallic-based supramolecular structures. These structures have the potential to be utilized in homogeneous catalysis and host-guest chemistry. Considering these precedents, this new proposal attempts to design organometallic Supramolecular Coordination Complexes (SSCs) for the selective recognition of organic substrates and for the preparation of new homogeneous supramolecular catalysts. The proposal is based on the development of four specific targets (actions): i) preparation of N-heterocyclic carbene-based metallo-polygons/polyhedra, ii) design of metallo-tweezers, and iii) assessment of the host-guest affinities of the supramolecular receptors obtained, and iv) evaluation of the catalytic properties. For this latter point, we will focus our interest in exploiting the supramolecular interactions established between the catalyst (host) and the substrate (guest) to induce enhanced activities and selectivities.

Eligibility: Applicants must have a BSc and MSc in Chemistry, and have experience in synthesis and characterization of organometallic compounds. Knowledge in supramolecular chemistry and homogeneous catalysis will be highly valued. Most of all: **We are looking for highly motivated candidates!!!**

Applications:

One PDF file should be submitted to or Eduardo Peris (eperis@uji.es) before June 30th

The file should include:

- i) a motivation letter
- ii) a short CV including a description of previous research experience.
- iii) names of two potential academic referees

Estimated Starting date: October 1st 2020, or Jan 16th 2021 (if visa documents are required)