

Ph. D student call in “Time-resolved X-ray spectroscopy in biological and chemical catalysis” at CSIC-ICMM, Instituto de Ciencia de Materiales de Madrid within the Consejo Superior de Investigaciones Científica.

Brief description of our research group/[Moonshiram Group \(wordpress.com\)](https://moonshiram.wordpress.com):

Our research group is focused on the development and application of advanced spectroscopic tools for the design of active catalysts for water oxidation, proton reduction, and methane to methanol production processes. We are interested in the development of static and time-resolved X-ray based spectroscopic approaches, including X-ray absorption (XAS) and X-ray emission spectroscopy (XES), to understand the critical electronic, energetic, and geometric requirements of the water splitting and methane oxidation reactions necessary for achieving economically feasible catalysts. Our research is particularly oriented towards ultrafast pump (laser), X-ray (probe) studies of metal noble-free photosensitizers, and multimolecular photocatalytic systems for artificial photosynthesis in the femtosecond-microsecond time regime. Combined analysis of experimental data on structures, electronic configurations and spin states provides valuable information to understand the operation mechanism.

Ph.D project funded over 3 years:

The project will consist in studying solar fuel catalysts through static and ultrafast *in-situ* X-ray spectroscopy and electrochemistry. The main objectives of the project will be to probe the electronic and structural changes occurring near the active catalytic site through X-ray absorption, emission, and resonant inelastic scattering spectroscopy. The student will also be trained in Raman, Electron Paramagnetic Resonance Spectroscopy, and X-ray photoelectron spectroscopy. The Ph.D. student will assist in writing the beamtime proposals, and carrying out the synchrotron and laboratory-based experiments, data analysis and interpretation.

Required Qualifications:

1. M.S in chemistry, Physics or Biological Science
2. Experience in synthesis
3. Strong analytical skills, written and verbal communication skills

Candidates are required to submit a complete an updated CV with a brief description of the previous research and a motivation letter. Applications should be sent to the email dooshaye.moonshiram@csic.es before **October 1st 2023**