**MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2021**

**EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS**

## HOST INSTITUTION

NOVA University Lisbon | ITQB NOVA - Instituto de Tecnologia Química e Biológica António Xavier

## RESEARCH GROUP AND URL

Organometallic Catalysis Group
https://www.itqb.unl.pt/research/chemistry/organometallic-catalysis

## SUPERVISOR (NAME AND E-MAIL)

Beatriz Royo
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## SHORT CV OF THE SUPERVISOR

Beatriz Royo is Principal Investigator, Group Leader of the Organometallic Catalysis Lab, and Head of the Chemistry Division at ITQB NOVA, University Nova of Lisbon. She graduated in Chemistry at University of Alcalá (Spain) and obtained her PhD degree in 1993 from the University of Sussex, UK, under the supervision of Prof. Michael F. Lappert. After four years in University of Alcalá as Assistant Professor, she moved to ITQB NOVA (Portugal) to join the group of C. Romão. In 2004, she started her independent career at ITQB NOVA as Head of the Organometallic Catalysis group. Her research spans the areas of synthetic organometallic chemistry and catalysis. Her group has developed sustainable catalytic methods for a range of organic transformations using Earth-abundant metals and N-heterocyclic carbene ligands. Her current research interests include hydrosilylation, hydrogen borrowing processes, oxidative coupling reactions and catalytic methods for the activation of $CO_2$ mediated by 3d metals.

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## 5 SELECTED PUBLICATIONS

- S. A. C. Sousa, Sara Realista, B. Royo (2020). Bench-Stable Manganese NHC Complexes for the Selective reduction of Esters to Alcohols with Silanes, *Adv. Synth. Catal*. DOI:10.1002/adsc.202000148.
- M. F. Pinto, M. Olivares, A. Vivancos, G. Guisado-Barrios, M. Albrecht, B. Royo (2019). (Di)Triazolylidene Manganese Complexes in Catalytic Oxidation of Alcohols, *Catal. Sci.Technol*. 9:2421-2425. DOI: 10.1039/c9cy00685k.
- S. A. C. Sousa, C. J. Carrasco, M. F. Pinto, B. Royo (2019). A Manganese N-Heterocyclic Carbene Catalyst for Reduction of Sulfoxides with Silanes, *ChemCatChem* 11:3839-3843. DOI: 10.1002/cctc.201900662. Selected for Cover Picture of the Special Issue *Women of Catalysis*
- F. Franco, M. F. Pinto, B. Royo, J. Lloret-Fillol (2018). Highly Active N-heterocyclic Carbene Mn(I) Electrocatalysts for CO2 Reduction, *Angew Chem Int. Ed*. 57:4603-4606. DOI: 10.1002/anie.201800705. Highlighted in ScienceDaily, RSC, on 6 March 2018, and in AzoCleanTech on 9 March 2018.
- M. F. Pinto, S. Friães, F. Franco, J. Lloret-Fillol, B. Royo (2018). Manganese N-Heterocyclic Carbene Complexes for Catalytic Reduction of Ketones with Silanes, *ChemCatChem* 10, 2734-2740. DOI: 10.1002/cctc.201800241. Selected as a Very Important Paper and Highlighted in the Cover of the journal.

## PROJECT TITLE AND SHORT DESCRIPTION

***Depolymerization of Waste Polymers Using Cheap Metal Catalysts***

The project proposed in this application aims to take a step forward in the treatment of waste polymers. It is well known that plastics play an important role in our lives. These materials are used in agricultural industry, automotive, medicine, and electronics, among other applications. However, plastic production leads to serious environmental problems and for this reason, it is crucial to have mechanisms to carry out recycling. Nowadays, of the 360 million tons of plastic produced each year, only 9% is recycled. Although there are several ways to carry out the recycling process, the problem is that the methods currently used are not economically profitable or are not effective in recovering materials. For this reason, it is essential to develop new technologies that are able to carry out recycling effectively. The strategy to be developed in the present proposal is the selective depolymerization of waste polymers, breaking down the polymers into valuable monomers or building blocks that could be then reused. Chemically recyclable polymers represent a circular economy approach to sustainability.
The aim of this project is to develop efficient catalytic processes for the reductive depolymerization of waste polymers through transfer hydrogenation and hydrosilylation processes using Earth-abundant metal catalysts. To meet this goal a family of Mn, Fe, and Ni organometallic complexes will be synthesized and applied as catalysts for depolymerization reactions.

## SCIENTIFIC AREA WHERE THE PROJECT FITS BEST*

Chemistry (CHE)