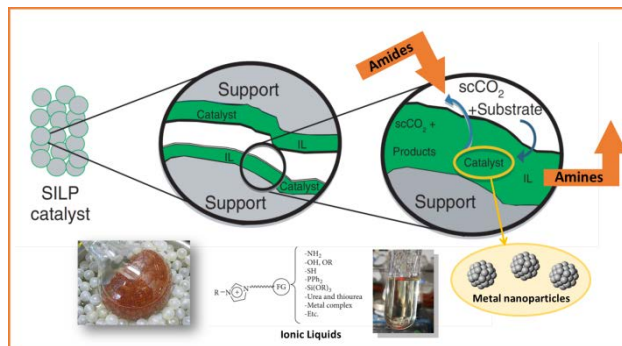


## Marie-Curie PhD scholarship for a double diploma from the Technical University of Denmark, Lyngby (Denmark) and the Université Toulouse 3 Paul Sabatier (France)

**Title: “Selective hydrogenation of amides with supported transition metal nanoparticles”**

**Project description:** This PhD project aims at developing new catalysts based on supported functionalized ionic liquid-stabilized metal nanoparticles (NPs)<sup>1</sup> for the hydrogenation of amides reaction.<sup>2</sup> This approach is expected to combine the advantages of the supported ionic liquid-phase (SILP) technology<sup>3</sup> (optionally in combination with  $scCO_2$  as substrate carrier for low-volatile substrates) for catalyst immobilization and continuous processing with the high efficiency of ultra-small NPs produced by the organometallic synthesis method. Functional ILs are expected to control the NP growth and dispersion in the catalyst support, allowing activity and selectivity, as well as stability and durability, to be enhanced by their embedment in the IL phase. The catalysis will be applied to substrates targeting value-added and biosourced ones that are of interest to an industrial partner. The student will receive research training in inorganic and organic chemistry (metal nanoparticle and functionalized ionic liquid syntheses), coordination chemistry and continuous flow catalysis.



<sup>1</sup> (a) T. Ayvali, K. Philippot, in *New Materials for Catalytic Applications*, E. Kemnitz and V. Parvulescu (Eds.), Elsevier, **2016**, 41-79. (b) C. Amiens, D. Ciuculescu-Pradines, K. Philippot, *Coord. Chem. Rev.*, **2016**, *38*, 409-432.

<sup>2</sup> (a) A. M. Smith, R. Whyman, *Chem. Rev.*, **2014**, *114*, 5477-5510.

<sup>3</sup> (a) *Supported Ionic Liquids: Fundamentals and Applications*, R. Fehrmann, A. Riisager, M. Haumann (eds), **2014**, Wiley-VHC. (b) A. Riisager and R. Fehrmann, WO2006122563A1 (Wacker Chemie). (c) A. Riisager, R. Fehrmann, J. Xiong and E.J.Garcia-Suarez, WO2011026860A1.

**Period of the fellowship:** from 1/10/2020 to 30/09/2023 (36 months).

**Funding:** The Horizon 2020 Marie Skłodowska-Curie Action (MSCA) Initial Training Network (ITN) programme of the European Commission funds this fellowship through the “European Joint Doctorate” (EJD) Network entitled “**Coordination Chemistry Inspires Molecular Catalysis**” (CCIMC) which offers a competitive PhD salary.

**Recruiting institution and training plan:** The PhD student will be employed and perceive salary from the Technical University of Denmark (DTU) throughout the study but spend approximately half of the time at the Laboratoire de Chimie de Coordination (LCC), a research institution of CNRS associated to the Université de Toulouse, according to a bilateral agreement for the double diploma. Moreover, a secondment period (3 months) is planned with an industrial partner (IFPEN, France) to evaluate the developed catalysts on industrial applications. As part of the CCIMC ITN, the student will participate in numerous stimulating and rewarding training events including tutorials, network workshops, international workshops and an international school.

**Eligibility:** The successful candidate must have obtained a Master’s degree (or a similar degree with an academic level equivalent to a two-year Master's degree) before starting the PhD study (1/10/2020), but may apply before having received it. The candidate should further satisfy the MSCA mobility rule (no more than 12 months of work and/or residence in the recruiting institution Country within the last 3 years).

**Contacts:** Prof Anders Riisager ([ar@kemi.dtu.dk](mailto:ar@kemi.dtu.dk)) at DTU-Lyngby; Dr Karine Philippot ([karine.philippot@lcc-toulouse.fr](mailto:karine.philippot@lcc-toulouse.fr)) at LCC-CNRS-Toulouse.

**For more information and application procedures:** [www.ccimc.eu](http://www.ccimc.eu)