



DN-MSCA-Horizon Europe
Grant n°101119277

In the frame of the Doctoral Network MSCA Horizon Europe “ChimSep” dedicated to the integration of membrane separations (Organic solvent nanofiltration and membrane distillation) in fine chemistry, 13 PhD projects are funded for 36 months: 8 dealing with membrane science and 5 dealing with homogeneous catalysis.

See all the 13 projects at <https://theses.doctorat-bretagne.fr/dn-chimsep>

Title - PhD#7 - Transition metal-based catalysts for hydrogenation & carbonylation of bio-based substrates **Joint doctorate**

Offer description

PhD#7 will study the hydrogenation of platform chemicals and the carbonylation of fatty acid esters using Ni, Ru, Fe, and Pd catalysts. He/she will prepare tailor-made catalysts for efficient membrane separation in toluene. At LIKAT (22 months) PhD#7 will prepare the targeted Ni, Ru and Fe complexes. The design of these new complexes is such, that there are extra side chains on the ligands, which make them more polar and/or bulkier. PhD#7 will especially evaluate the nickel catalyst (furfural hydrogenation to tetrahydrofurfuryl alcohol), for which the kinetic parameters of the hydrogenation of furfural to 1,4-pentanediol will be measured. In the same way Fe and Ru complexes will be evaluated for the hydrogenation of furfural into 1,4-pentanediol. OSN (organic solvent nanofiltration) of these reaction mixtures will be studied at VITO where a 1/2-week short stay will be organised for direct feedback from Membranologist. PhD#7 will spend 2 months at *Servier* working on homogeneous catalytic reactions and processes at an industrial scale, where he/she will also be trained at the analytical tools implemented in the pharmaceutical industry. At University of Rennes-ISCR-OMC team (12 months), he/she will pursue the studies initiated by PhD#4 concerning the alkoxycarbonylation of long chain alkenes, with feedback between the two PhDs. Thus, PhD#7 will be involved in catalyst synthesis and catalyst testing meeting the principles of separability via OSN. The preparation of the PhD thesis and defence will be finalized at LIKAT.

Keywords:

Molecular chemistry; Homogeneous Catalysis; Organometallic chemistry; biomass

PhD starting date: 01/11/2023

Application deadline: 31/08/2023 (23:59:00, Paris)

<https://theses.doctorat-bretagne.fr/dn-chimsep>

Work location: Rostock, Germany (22 months) & Rennes, France (12 months)

The Doctoral Candidate will be enrolled in a joint doctorate between two partners of the network. He/she will spend 22 months with the hosting partner (Likat, Germany) of the present application and then a mobility of 12 months at University of Rennes, France

During the doctoral period, the PhD will also spend 2 months at Servier-France

Contacts

Thesis main supervisor (Germany)

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Thesis second supervisor (France)

Sophie Guillaume; Jean-François Carpentier

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Required Education Level: Master degree or equivalent

Skills/Qualifications

Hands-on experience with air and moisture sensitive materials and high pressure systems, excellent preparation skills.

Required Language: English, level: Good

Required research experience

An internship of several months in a research laboratory involved in organometallic chemistry and or homogeneous catalysis.

Website for additional job details;

See application platform: <https://theses.doctorat-bretagneoire.fr/dn-chimsep>
section "Présentation de l'école doctorale » (doctoral network presentation)

Salary

The EU provides support for each recruited researcher in the form of

- Gross salary should be around 2334 € per month (net around 1858 €)
- + 600 € of mobility allowance. All eligible researchers recruited within a DN are entitled to receive this allowance. It contributes to the private mobility related expenses of the researcher.
- + 495 € of family allowance per month (if eligible to the conditions: be married or equivalent and/or have a child; family, long-term leave and special needs allowances. The family status of a researcher will be determined at the date of their (first) recruitment in the action and will not evolve during the action lifetime.