CONVOCATORIA DE PRÁCTICAS INTERNACIONALES
CALL FOR INTERNATIONAL INTERNSHIP

1. INFORMACIÓN DEL SUPERVISOR Host applicant information

NOMBRE Name

CARGO Position

CONTACTO Contact: Email

Teléfono Phone

DEPARTAMENTO/FACULTAD/INSTITUCIÓN Departament/Faculty/Institution

Department of Bioscience Engineering/Faculty of Science/University of Antwerp

TIPO DE ORGANIZACIÓN Organization type: EPLUS-EDU-HEI

ORGANISMO PUBLICO Public Body: ■ SI Yes ☐ NO

SIN ANIMO DE LUCRO Non-Profit: ■ SI Yes ☐ NO

TAMAÑO Size: > 250

WEB: www.uantwerpen.be

DISPONIBILIDAD PARA EVALUAR INFORMES DE CONVALIDACION DE CREDITOS ECTS
¿Es una prioridad para el supervisor que el estudiante valide los créditos?
Availability to evaluate ECTS credit validation reports
Is it a priority for the supervisor that the student validates ECTS credits?

I am available to evaluate credit evaluación report, Not a priority that the student validates credits.

2. DESCRIPCION DEL PROYECTO Project description

FECHAS ORIENTATIVAS DE REALIZACION DEL PROYECTO
Wished/approximate dates for the mobility period

Following the availabilities of the trainee

FLEXIBILIDAD DE FECHAS
Flexibility in dates

■ SI yes
☐ NO

TÍTULO DEL PROYECTO Project title: Experimental demonstration of the OCM without catalyst

NUMERO DE HORAS DE TRABAJO POR SEMANA Number of working hours per week

35

PROGRAMA Detailed programme of the traineeship

Oxidative coupling of methane (OCM) is a promising route for the direct conversion of the (relatively) low cost methane to high value chemicals (ethane & ethylene: C_{2+}). While considerable work effort has been spent on the catalytic OCM process with limited success during the past 35 years, past research on homogeneous OCM is now receiving renewed interest: increasing the pressure increases the C_{2+} yield to the levels normally obtained with a catalyst at amospheric pressure, but without its disadvantages (e.g., deactivation, sintering of the active phase due to the high temperatures).
In this project, the trainee will experimentally characterize the OCM reaction in a max 10 bar high temperature inductively heated reactor. The student will be responsible for the hydrodynamic characterization of the reactor setup via tracer studies in the gas phase, prepare a design of experiment and perform the experiments. To conclude, the student will do a preliminary kinetic characterization study, as well as reactor simulations using basic engineering models (e.g. plug flow reactor) but coupled to state-of-the-art microkinetic models. By doing so, she/he will collaborate with our group to develop a new reactor optimizing the ethylene production while avoiding overoxidation of methane.

CONOCIMIENTOS, HABILIDADES Y COMPETENCIAS QUE HAN DE ADQUIRIR LOS ESTUDIANTES
Knowledge, skills and competences to be acquired by the end of the traineeship

The trainee will gain invaluable knowledge of experimental tools used in reactor design and characterization (online quadrupole mass spectrometer for gas concentration analysis, tracer studies for hydrodynamic characterization, etc.), including complex reactor simulation using state-of-the-art kinetic models. As important, the trainee must be able to communicate effectively his/her results. All in all, the main expected learning outcomes are:

- Perform characterization and basic modelling of chemical reactors by application of his/her knowledge in the field of chemical reaction engineering;
- Communicate and discuss proposals and conclusions in multilingual forums and weekly follow-up meetings, specialized and non-specialized, in a clear and unambiguous way in English;
- Prepare a manuscript summarizing her/his work in English;
- Introduction to the field of scientific Research, favoring independence and creativity

MONITORIZACION Monitoring plan

The trainee will work under the supervision of Prof Patrice Perreault, and will work in collaboration with 1 senior PhD students and/or postdoc working on this project. Prof Perreault and/or the PhD students/postdoc will train the trainee on the use of experimental reactor characterization tolos, reactor simulation, and kinetic modelling. For the first month, the trainee will be in close contact with Prof Perreault, 1-2 days per week. For the remaining period, the trainee will be supervised in the form of a weekly meeting (where he/she will have to present the project advancement), and will spend half a day per week for training.

EVALUACIÓN Evaluation plan

The work of the trainee will be evaluated during the weekly follow-up meetings. The researchers are requested in my group to present their achievements, discuss problems & challenges, as well as to propose a planning for the week to come. In this way, they are confronted to their actual versus planned progress, and to propose corrective measures. In the case where the corrective measures are considered insufficient, we as a group explore more adapted measures (including increasing the workforce involved in a project).

However, more than a mere evaluation, these meetings serves as a platform to exchange and challenge scientific ideas, and for problem solving. During the course of this project, the trainee will also be required to summarize her/his ideas in the form of a manuscript, and this manuscript is periodically evaluated (after every milestone: e.g. when the literatura review is completed, the experimental sections, results and discussion, and so on). Proposed modifications/corrections are provided by myself, as well as the research team accompanying the trainee. As the goal of this Erasmus exchange is also (often) to improve the written and speaking English, all communications (including the manuscript) are in English.

ESPECIFICACIONES ADICIONALES EN LA INSTITUCIÓN DE ACOGIDA
Additional specifications of the host institution

OTRA INFORMACIÓN RELEVANTE Other relevant information

This project is fully supported via an ongoing research project (fully funded, c.f. Antigoon database via Patrice Perreault's University of Antwerp webpage for an overview of the currently running projects). This project is also a request to initiate research on this topic from a major energy company.

3. PERFIL Y REQUISITOS DEL ESTUDIANTE Student profile and requeriments

AREA/S DE ESTUDIO Research area/s

Chemical engineering

NIVEL DE ESTUDIO Level of studies

Student with at least knowledge of chemical reaction engineering.

REQUISITOS PREVIOS DE CONOCIMIENTOS TECNICOS O EXPERIENCIA
Student required expertise and technical knowledge:

Basic knowledge of Matlab/Python, and chemical reaction engineering concepts (ideal reactors design and simulation, basics of chemical kinetics, residence time distribution, etc.). Independence and creativity is key: we will not ask the student to do repetitive manual task, but either, the student will be treated as an independent researcher, even though supported by a PhD and/or postdoc.

IDIOMA Y NIVEL MINIMO RECOMENDADO PARA REALIZAR LAS PRACTICAS
Language and minimum level recommended for internships

B2 in English (but professor speaks Spanish)

REQUISITOS ADICIONALES DE LA INSTITUCION DE ACOGIDA
Additional requirements set by the host institution