OPEN PHD POSITION FOR MARIE SKŁODOWSKA-CURIE INNOVATIVE TRAINING NETWORKS (MSCA-ITN) AT CSIC

**MSCA-ITN**
MSCA-ITN-EJD PIONEER Plasma catalysis for CO₂ recycling and green chemistry. Grant number: 813393

**PROJECT**
Nanostructured catalysts for plasma CO₂ methanation

**PhD SUPERVISOR(S)**
M Victoria Navarro/Elena Galvez

**SCIENTIFIC AREA**
Physics, Applied Physics, Physical Chemistry, Chemistry, Catalysis

**HOST INSTITUTION**
Instituto de Carboquímica (ICB)/ Sorbonne Université

**DURATION**
36 months

**FIXED START DATE:**
Application deadline: 03/05/2019
Start date: 02/09/2019

**PLANNED SECONDMENT(S):**
17 months in Sorbonne Université and 2 months CNRS-LPP with Olivier Guaitella

**EMAIL OF THE PhD SUPERVISOR(S)**
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**WEBSITE OF THE ITN-MSCA**
https://www.co2pioneer.eu

**WEBSITE OF THE RESEARCH GROUP OR CENTRE/INSTITUTE**
https://www.icb.csic.es/grupo/grupo-de-investigaciones-medioambientales/
http://www.dalembert.upmc.fr/frt/
IDEAL CANDIDATES

Degree and master on Physics, Applied Physics, Physical Chemistry, Chemistry, Catalysis, Chemical Engineering

Special attention will be paid to match the education of the candidate with the chosen topics, the number of previous publications or communications in conferences, mobility experience and public awareness. Because of the need for multidisciplinary approach in all the PhD topics of PIONEER, the adaptability of the candidate to different fields of science will be especially valued

DESIRABLE CANDIDATE REQUIREMENTS

The eligibility criteria must be followed:

- **Early-Stage Researchers (ESRs)/fresh MSc graduates**: All candidates to be recruited in PIONEER must have worked no more than 4 years as researcher and have not been awarded any doctoral degree at the date of the employment.

- **Transnational mobility**: The ESR is required to undertake transnational mobility (i.e. move from one country to another) when taking up their appointment. Nationality is not a criterion.

The candidates must submit through the project website: [www.co2pioneer.eu/applications](http://www.co2pioneer.eu/applications) the followings:

- Bachelor and master's degree certificate and official transcript (grades)
- English language proficiency
- Curriculum Vitae/CV (with List of publications - if any)
- Reference Letter
- Motivation letter
- Proof of residence

BENEFITS

Extensive and dedicated training programme including secondments, workshops, schools and non-research oriented skills.

Average gross salary 27000 €/year (may vary according to institution)

Including living + mobility allowances. PhD tuition fees covered + research, training and network costs
PhD PROJECT

The main objective of this ITN project is the formation of a new generation of experts in the CO2 valorisation using plasma-catalytic coupled processes. Intensification of CO2 valorisation processes can contribute to the stabilization of CO2 concentration in our atmosphere through the production of synthetic fuels that will play an important role in our transition to a 100% renewable future. Chemical and thermochemical processes are often accelerated by specific catalysts that used in combination with plasma could turn sluggish CO2 valorisation processes feasible. The Project will be directed towards the understanding of CO2 plasmas, their interaction with solid catalysts and fundamentals of reaction mechanisms involved with complementary formation of PhD students on soft skills, specific formation on managing, marketing and business.

Nanostructured catalysts for plasma assisted CO2 methanation
The aim of the PhD is to comprehend key parameters controlling the catalytic-plasma methanation process with Ni/CeO2 catalyst and DBD plasma. Optimize the synthesis variables of catalysts to produce the determined solid properties that maximize the yield and stability of plasma assisted methanation at optimal reaction conditions. To reach this aim the ERS will be trained in the catalyst synthesis methods relating synthesis conditions with catalyst properties development at CSIC-ICB. The ERS will be trained as well in the use of plasma equipment and gas products analysis (GC) at SU. In addition, different tools will be provided to the ESR to analyse characterization results of catalysts.

14 more titles in the ITN
1.- Electric fields on catalyst covered dielectric surfaces under plasma exposure
2.- CO2 dissociation for value-added products at atmospheric pressure using tailored radio-frequency and nanosecond pulsed power input
3.- Improving the energy efficiency of CO2 conversion and activation in a microwave plasma by a combination of experiments and modelling
4.- Energy input and relaxation in atmospheric pressure CO2 plasmas
5.- Valorization and optimization of plasma assisted CO2 catalytic reduction of CO2 methanation
6.- Efficient catalysts preparation for plasma-assisted CO2 methanation
7.- Novel catalysts for plasma-assisted tri-reforming of methane
8.- Tayloring selectivity with different plasma sources
9.- Plasma-catalytic CO2 hydrogenation for the production of molecules for green chemistry
10.- Time-resolved detection of transient species in nanosecond repetitively pulsed discharges for CO2 conversion
11.- Bending and stretching to promote catalysis
12.- Investigating methods to vibrationally excite CO2 with plasma
13.- Plasma-assisted production of organic acids by reacting CO2 with water
14.- Role of vibrationally excited molecules on catalytic surfaces