MSCA POSTDOCTORAL FELLOWSHIP: UNRAVELING THE MICROWAVE/CATALYSTS COMBINED

Company Description

CIC energiGUNE is the Research Center for electrochemical and thermal energy storage, a member of the Basque Research and Technology Alliance- BRTA, and, a strategic initiative of the Basque Government. CIC energiGUNE was created in 2011 to generate excellent research in materials and systems for energy storage, maximizing the impact on results to the Basque Business Network, through collaboration with universities, research centers, and companies. CIC energiGUNE has a dynamic research team of more than 100 researchers and is extremely well equipped with a wide range of up-to-date facilities that are fully available for all its researchers. Also, the European Commission has recently awarded CIC energiGUNE with the 'HR Excellence in Research' which reflects its commitment to achieving fair and transparent recruitment and appraisal procedures and certifies the existence of a stimulating and favorable work environment for researchers in the institution. For more details on CIC energiGUNE's research activities please visit our website at: http://www.cicenergigune.com

Information

Deadline: 2021-06-18
Country: Basque Country
Category: Business
City: VITORIA-GASTEIZ
Province: Araba / Álava

Company

CIC energiGUNE

Main functions, requisites & benefits

Main functions

The Project will cover two of the hot topics that the world is currently facing: 1) The generation of green energy sources such as H2 and 2) The conversion of the huge amounts of waste that human beings are generating in energy and/or added-value materials. These two concerns must be covered by the development of efficient and low cost disruptive technologies or by combining existing technologies. In this sense, it is know that the main content of waste vegetable oils and plastics (e.g. polyethylene (PE), polystyrene (PS) etc.) are carbon and hydrogen and in less extension oxygen. Consequently, the deconstruction of these materials in an effective way will yield mainly H2 and carbon materials. Nevertheless, almost all methods employed for these materials deconstruction nowadays are not highly selective towards H2 producing other undesired gases such as CO2, CO etc., thus hampering its direct use in the final application. Therefore, the project will be focused on to produce selectively, rapidly and safely H2 and added-value carbon materials by catalytic deconstruction of the above mentioned waste by combining microwave radiation and rational catalysts designing. The interest towards the catalytic deconstruction process under microwave radiation to generate H2 is due to: i) The proven but not fully understanded positive effect of microwave in many catalytic reactions. ii) The need of designing more active and robust catalytic systems towards an safe, effcient and selective generation of H2 at low temperatures. iii) The high availability of the waste vegetable oil and plastics as feedstock. iv) The development of new solutions for a rapid and safe availability of H2 when demanded. The Project main tasks will include: Basic understanding of the reaction mechanism. Basic understanding of the microwave radiation effect on the selective H2 production. Design and characterization of novel catalytic systems to improve the selective production of H2 from waste (vegetable oils and/or PE and PS). Life cycle analysis (LCA) and comparison with other current processes to produce H2. Construction of a small scale laboratory prototype (TRL 4) to evaluate the performance of the best catalytic system. Techniques to be used: Standard organic/inorganic sysnthetic techniques. High pressure and microwave reactor techniques. Techniques to manipulate sensible compounds to oxygen and/or moisture (Glove-box and Schlenk). Characterization techniques such as, NMR, TEM, SEM, X-ray diffraction, TPD, N2-physisorption. Analyses techniques such as GC-FID, GS-MS.

Requisites

PhD in Organic/inorganic Chemistry or related fields. Experience in microwave technology. Preferable but not mandatory knowledge in catalysis and catalytic systems: synthesis and characterization of catalysts (homogeneous and heterogeneous). Preferable but not mandatory knowledge in ionic liquids technologies. Experience in characterization techniques such as NMR, GC-FID, GC-MS. Experience in characterization techniques such as SEM, TEM, X-Ray diffraction, N2 physisorption and TPD will be a plus. A team player who can collaborate with other groups, technological centers, and industry. Experience in finding out funding opportunities at EU level or similar. Very good verbal and written communication skills in English. MSCA Postdoctoral Fellowship Specific Requirements: Applicants should have recently completed their postgraduate studies (between 15/09/2013 and 14/09/2021). Applicants must have a strong publication record. It will be valuable that applicants have papers published with no contribution of the PhD supervisor and