



## AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

### Turno de acceso general

**Nombre:** MARTINEZ BERGES, ISABEL

**Referencia:** RYC2019-026929-I

**Área Temática:** Energía y transporte

**Correo Electrónico:** imartinez@icb.csic.es

#### Título:

Development of advanced energy conversion processes with reduced carbon footprint

#### Resumen de la Memoria:

The applicant has developed her research career between the Environmental Research group of Instituto de Carboquímica (ICB-CSIC) in Spain and the group of Energy Conversion Systems of the Department of Energy of Politecnico di Milano in Italy. Her research represents a highly innovative contribution to the fields of Energy, Chemical Process Analysis and Environmental Technology. The overriding aim of her research career has been the development of more efficient and environmentally friendly processes for the decarbonization of power production, industry and transport sectors. The different research topics that the candidate has tackled can be summarized in:

Clean hydrogen and power production

Decarbonized energy intensive industries (steel, cement and ammonia production)

Biomass and waste valorization routes: biomass/waste-to-fuels

In order to tackle the mentioned objective, the candidate has covered different research disciplines in all the research lines followed, including:

(i) Development of accurate methodologies and process simulation models to evaluate the performance of the different schemes proposed to elucidate their potential in terms of energy efficiency, CO<sub>2</sub> emissions and production costs.

(ii) Synthesis, characterization and testing of the functional materials needed for the novel technologies proposed for each of the topics mentioned.

(iii) Validation of the most promising technologies at lab-scale and pilot scale plants under relevant conditions for their industrial application.

The collaboration with numerous European and Spanish research institutions in the framework of multiple research projects (most of them mentioned in this document) has successfully contributed to the development of these research lines, which have resulted into promising solutions for the decarbonization of power production, manufacture and transport sectors.

#### Resumen del Currículum Vitae:

Dr. Isabel Martínez currently works as researcher at the Environmental research group at Instituto de Carboquímica (ICB-CSIC). She holds a PhD in Renewable Energies and Energy Efficiency from the University of Zaragoza, which deserved the highest qualification and was awarded with the Extraordinary Doctorate Award of such university and the best PhD thesis from the Grupo Español del Carbón in 2015. She undertook her PhD studies via two competitive grants (FPU fellowship (43 months) and Gobierno de Aragón fellowship (5 months)). By September 2014, she joined the Department of Energy at Politecnico di Milano in Italy as a postdoctoral fellow until December 2016. She obtained a competitive international fellowship by this University in this period.

Her track record includes 41 scientific publications, 36 of them in high impact factor peer-reviewed journals (28 Q1 and 8 Q2), 19 as first author and 15 as corresponding author. From her peer-reviewed publications, 7 are published in high-impact factor D1 journals (Chemical Engineering J. or Environmental Science and Technology among others). This scientific production accumulates 1060 citations (h-index 17) with 60 co-authors from 15 research institutions and Universities. Her scientific production includes 2 book chapters (Woodhead Publishing and IntechOpen) and 16 scientific reports. Moreover she is co-author of 1 scientific report invited by the European Energy Research Alliance (EERA) and co-inventor of 1 patent (non-licensed and extended to Europe and USA). She has 39 contributions in scientific conferences (24 oral presentations (1 as invited talk) and 15 posters), most of them being international (33). Dr. Martínez is Member of the Editorial Board of the International Journal of Energy, Environment and Economics (Nova Science Publishers) from November 2019 and acts as referee for numerous SCI journals (including for example Progress in Energy and Combustion Science, IF=26.467).

Her participation in R&D projects includes 11 competitive scientific projects, 6 of them funded by EU programmes (FP7, RFCS, H2020) and 5 from Regional and National Governments). She has participated in 6 non-competitive projects with private companies, being the principal investigator in one of them. Moreover, she currently supervises 1 PhD student and 1 MSc student (Chemical Engineering) and has successfully supervised 10 MSc students, 2 visiting PhD students and 1 BSc student. She has been teaching assistant for the course Energy Systems for MSc Mechanical Engineering students at Politecnico di Milano for three consecutive academic years. Concerning dissemination activities, she regularly conducts outreach activities for non-specialized audiences at the CSIC delegation in Zaragoza and in the open-doors day at ICB-CSIC. Moreover, she has recently participated in the currently ongoing FECYT project Ciencia CreActiva .



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### Turno de acceso general

**Nombre:** SOLER TURU, LLUIS  
**Referencia:** RYC2019-026704-I  
**Área Temática:** Energía y transporte  
**Correo Electrónico:** lluis.soler@gmail.com

#### Título:

Doped-titania photonic crystals for photocatalytic solar hydrogen generation (acronym: PHOXSOL)

#### Resumen de la Memoria:

I am a senior researcher (Principal Investigator) at the Institute of Energy Technologies (INTE) at the Technical University of Catalonia (UPC), specialized on heterogeneous photocatalysis, catalytic reactors for energy applications and fabrication of advanced nanomaterials. My research interests are in the areas of energy, engineering, chemistry and materials science, spanning from nanotechnology, catalysis, photocatalysis, reaction engineering and hydrogen generation. After 17 years studying numerous catalytic systems, I envisioned an innovative research line of a new generation of photocatalytic processes based on doped 3D-ordered microporous (3DOM) TiO<sub>2</sub>-based materials in microreactors. The slow photon effect phenomenon that takes place using these TiO<sub>2</sub>-based photonic crystals boosts both photogeneration of electron-hole pairs and localized surface plasmon resonance effect over metal nanoparticles. Merging the fields of 3DOM TiO<sub>2</sub> materials and microreactor technologies can lead to improved photocatalytic efficiencies in an unprecedented manner, representing a real new turn-of-the-screw in the sustainable production of hydrogen (H<sub>2</sub>). Last July 2019 I was granted as a Principal Investigator in the Retos investigación 2018 call of the Spanish Ministry with 166.980 for the next 3 years to keep developing my main research line.

Up to now, I have open collaborations with the University of Udine (Italy), University of Auckland (New Zealand), the Institute of Research on Catalysis and Environment in Lyon (IRCELyon, France), the Institute of Materials Science of Barcelona (ICMAB), the Catalan Institute of Nanoscience and Nanotechnology (ICN2), the Catalonia Institute for Energy Research (IREC), University of Barcelona (UB), the ALBA synchrotron, the KTH Royal Institute of Technology in Stockholm (Sweden), the Technical University of Dresden (TU Dresden, Germany) and the Max-Planck Institute for Intelligent Systems (Germany). I am currently involved in several research projects, which I expect to publish during this 2020.

From June 2012-September 2014, I carried out a long-term postdoctoral research in Germany (28 months) at the Leibniz Institute for Solid State and Materials Research (IFW Dresden) in Dresden and at the Max-Planck-Institute for Intelligent Systems in Stuttgart. During this period, I was working on the design, fabrication and testing of self-propelled catalytic nanomotors that are able to convert chemical energy into mechanical motion at the nanoscale. These advanced nanodevices can be used for multiple applications, from biomedicine to water remediation.

Previously, from 2010-2012, I was holding a postdoctoral position at the Autonomous University of Barcelona (UAB) under a technology transfer project concerning a H<sub>2</sub> generation process, which was developed and patented during my doctoral studies. We succeeded in selling the patent to Tonami Transportation Co., Ltd., in Japan.

I received my Ph.D. degree in chemistry from the UAB in 2010, developing new processes for H<sub>2</sub> production, which were based on oxidation of metallic aluminium by water, through heterogeneous reactions in alkaline media in the presence of multiple catalysts. The Research project was funded by MATGAS and Air Products companies. Previously, I obtained my MSc investigating a process for producing H<sub>2</sub> through photoelectrochemical redox reactions.

#### Resumen del Currículum Vitae:

##### 1) EDUCATION

- PhD in Chemistry, Autonomous University of Barcelona (UAB) (April 2010)
- Diploma of Advanced Studies (DEA) in Analytical Chemistry, UAB (December 2004)
- Degree in Chemistry, UAB (January 2002)

##### 2) CURRENT PROFESSIONAL SITUATION

Senior researcher (Principal Investigator) at the Institute of Energy Technologies and adjunct lecturer at the Department of Chemical Engineering at the Technical University of Catalonia (UPC) (October 2014 - ongoing)

##### 3) CITATION DATABASE INDICATORS, date 12/01/2020

###### 3.1) WEB OF SCIENCE & RESEARCHER ID

- Sum of the times cited: 1879



## AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

### Turno de acceso general

- Average citations per article: 48.05
- Average citations per article during the last 5 years (without including 2020): 300.02
- Sum of the publications in the first quartile (Q1): 35
- h-index: 20
- 3.2) SCOPUS
  - Citations: 1992
  - h-index: 20
- 3.3) GOOGLE SCHOLAR
  - Citations: 2418
  - h-index: 23
- 4) PUBLISHING TRACK RECORD
  - Sum of the publications in scientific journals: 41 (+3 ongoing)
    - 4 articles with >160 citations (including 2 articles with >280 citations).
    - Corresponding author in 5 articles.
    - First author in 12 articles and second author in 11 articles.
    - 15 articles published in open access.
  - Book chapters: 1 (+1 accepted, in press)
  - Sum of the international conference contributions: 54
    - Oral contributions: 26
    - Keynote talks: 4
    - Plenary conference: 1
    - Poster contributions: 23
  - Sum of the filed patents: 4
- 5) PARTICIPATION IN RESEARCH ACTIVITIES
  - Participation in competitive R&D projects: 9
    - + 1 as principal investigator, 3-years funded by the Spanish Ministry, call Retos-JIN 2018 ; 166980 .
  - Participation in non-competitive R&D projects: 6
    - + 1 as principal investigator, Funding Company: Apreslan S.A. February-April 2019; 3100
  - Organization on a conference organizing committee: 1
  - Reviewer of scientific papers in 12 international journals. 25 verified reviews at Publons.
  - Reviewer of competitive research project proposals of public funding entities in Argentina, Switzerland, Austria and Spain.
  - Reviewer of scientific contributions in the 16th Int. congress of catalysis.
- 6) SUPERVISION EXPERIENCE (last 5 years)
  - 3 PhD students
    - 1 PhD thesis awarded with the maximum qualification "Excellent cum Laude"
    - 1 PhD thesis awarded with an Excellent qualification.
    - 1 PhD thesis will be defended in September 2021
  - 5 BSc students
- 7) TEACHING EXPERIENCE
  - Chemistry lectures at UPC (September 2017 - ongoing), 250h
  - Assistant teacher of chemistry at UAB (2005-2009), 245h
  - Accreditations of Tenure-track lecturer and Tenured assistant professor issued by The Catalan University Quality Assurance Agency, AQU Catalunya.
- 8) GRANTS, PRIZES AND AWARDS
  - Principal Investigator (Retos-JIN 2018) 166980
  - Beatriu de Pinós (Marie Curie Postdoc Fellow, 2014-16) 91022,4
  - Forschungsstipendium vom IFW Dresden (Research Postdoctoral grant of IFW Dresden, 2012-13) 25200
  - Trainee research staff grant (Beca de Personal Investigador en Formación, PIF-UAB, predoctoral, 2005-09) 54490
  - Research support grant (Beca de apoyo a la investigación UAB, predoctoral, 2002-04) 29209,32
  - ALBA prize best poster (VIII AUSE Congress, Spain, 2017)
  - Poster prize (Functional hybrid materials conference, Sweden, 2016)
  - MRS Singapore Best Paper Award (FINSTA conference, India, 2014)
  - Young Research Award (MNM2014 conference, Germany, 2014)



## AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

### Turno de acceso general

**Nombre:** LISBONA MARTIN, MARIA PILAR

**Referencia:** RYC2019-026414-I

**Área Temática:** Energía y transporte

**Correo Electrónico:** plisbona@gmail.com

#### Título:

Analysis and optimization of low-carbon energy systems

#### Resumen de la Memoria:

Master in Chemical Engineering (2002) and PhD in Renewable Energy and Energy Efficiency (2012) from the Universidad de Zaragoza (Premio extraordinario doctorado & 'Cátedra MLN' Award for the best PhD Thesis of the Universidad de Zaragoza in environmental topics). For my dissertation I worked on the experimental and theoretical development of a novel high temperature carbon capture technology, Ca-looping. This work helped to significantly advance our knowledge on hydrodynamics of interconnected fluidized beds for Ca-looping and the structural requirements for their incorporation in existing and future power plants and their thermodynamic, economic and environmental strengths and weaknesses. In 2008, I was awarded by International Energy Agency to participate in its CCS International Summer School providing me the opportunity to collaborate with over 80 professors and researchers from all over the world and create a valuable scientific network.

I worked from 2004 to 2007 as researcher in UMSICHT Fraunhofer Institute (Germany) and the Università degli Studi di Perugia (Italy) in the field of fuel cells and from 2007 to 2015 in Fundación CIRCE (Spain) developing carbon capture and utilization technologies. As visiting researcher, I spent 3 months in the Universidad Técnica Federico Santa María (Chile) in 2015 and 3 months in the Università di Pisa (Italy) during 2017. Recently, I have been awarded with an ARAID senior researcher position within a competitive call for international researchers in Aragón.

My teaching experience begun in 2009 as part-time Assistant Professor in the Universidad de Zaragoza during 3 academic courses. Between 2015 and 2018, I worked as PhD Assistant Lecturer in the Universidad de Valladolid where I taught courses on thermodynamics, heat transfer and bioenergy technology. I have always received highly positive feedback in my teaching assessments. As visiting professor, I also taught in 2013 and 2015 two intensive courses on energy efficiency in HUST (China) within the ICARE China-EU Institute for Clean and Renewable Energy

I have supervised 9 BEng and MEng Thesis with quality indexes (awards, conference communications and JCR publications) and 2 PhD Thesis (both Premio extraordinario doctorado). I co-authored 32 JCR peer-reviewed articles (85% in Q1 JCR), 4 books and chapters and participated in 44 international conferences. Member of the scientific committee in 1 international conference and of the organizing committee of 4 international conferences and workshops.

I participated in 11 competitive research projects (national and European) and 6 private contracts. Since 2014, I have led as principal investigator 3 competitive projects (ENE2013-45353-R, AEI-020500-2014-79 and Fundación Iberdrola) and a private contract. Supporting my research via external funding sources has given me the opportunity to realize independent research and gain experience in leading complex multi-disciplinary projects, as well as managing actions and funds. My research activities have been focused on clean energy systems and energy efficiency, mainly through the simulation and optimization of energy conversion technologies using thermodynamic, economic and environmental criteria. They include fuel cell systems, renewable and fossil power plants, renewable methane production and zero emission energy processes integrating CCU.

#### Resumen del Currículum Vitae:

Pilar Lisbona Martín (Zaragoza, 1978)

10/2019 - present Senior Researcher, ARAID, Spain  
09/2018 - 09/2019 Senior Researcher, Universidad Zaragoza (Unizar), Spain  
06/2015 - 08/2018 Profesor Ayudante Doctor, Universidad Valladolid (UVa), Spain  
09/2009 - 08/2013 Profesora Asociada, Unizar, Spain  
02/2007 - 06/2015 Researcher, CIRCE, Spain  
06/2005 - 01/2007 PhD Research Fellow, Università di Perugia, Italy  
01/2004 - 08/2004 First stage researcher, Fraunhofer Institute, Germany  
03/2003 - 07/2003 First stage researcher, CIRCE, Spain

#### EDUCATION

2012 PhD in Renewable Energy and Energy Efficiency, Unizar, Spain  
2002 MEng in Chemical Engineering, Unizar, Spain  
2000 - 2002 Erasmus student, Danish Technical University, Denmark



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#### FELLOWSHIPS & AWARDS

4 Erasmus+ STT mobility grants: 2 International Staff and 2 English courses.

2 Mobility grants José Castillejo

Best PhD Thesis in environmental engineering 2012-2013. Cátedra MLN Unizar, Spain

Premio extraordinario doctorado, 2012-2013, Unizar, Spain

Scholarship Summer School on CCS (Canada). International Energy Agency

4 Scholarships for young researchers: Italian Ministry of University and Research, Italy; University of Perugia, Italy; Unizar, Spain and Government of Aragon, Spain.

#### RESEARCH ACTIVITY

11 projects publicly funded (3 European, 8 national) and 6 non-competitive private contracts

PI in 3 competitive national projects (ENE2013-45353-R 47000 ; AEI-020500-2014-79 26515 ; Fundación Iberdrola, 20000 ) and 1 private contract

32 peer-reviewed papers in JCR journals (27 in Q1)

1 book and 3 chapters

Citations: 1086 (Scopus)

h-index: 17 (Scopus)

44 contributions in international conferences, 1 invited lecture in international workshop

Supervised 2 PhD Thesis and member of 2 PhD Thesis Committees

Reviewer for over 60 JCR-indexed journals and conferences

2 pre and 2 post-doc research stays; Fraunhofer Institute, Università di Perugia, Università di Pisa, and USM (Chile)

#### TEACHING EXPERIENCE

1036 hours of graduate and undergraduate teaching (UNIZAR, UVa).

2 Energy Efficiency courses in English, 40 hours (China)

7 Bachelor & Master Theses (UNIZAR, UVa and HUST)

6 projects of teaching innovation (1 as PI)

Spanish national accreditation as Profesor Titular

I3 certification

#### I+D MANAGEMENT

PI in 3 competitive national projects (ENE2013-45353-R, AEI-020500-2014-79, Fundación Iberdrola) and 1 private contract

Academic Secretary and SICUE Coordinator (2 courses), Internship Coordinator (6 months) and International Relations Coordinator (3 courses), UVa, Spain

Organizing committees: 3 international conferences and 1 workshop

#### COMMITTEES

Expert Evaluator for H2020-MCSA (2018, 2019,2020), for ERC-2018-COG (2018) and H2020-LC (2018). European Commission

Expert Evaluator for Agencia Estatal de Investigación, Spain

Expert Evaluator for Ministry of Education and Science (2014, 2017), Republic of Kazakhstan

Scientific Committee of 1 international conference

#### INTERNATIONAL EXPERIENCE

4 years abroad: Denmark, Germany, Italy and Chile

4 languages: Spanish, English, Italian, German

31 coauthors of 5 nationalities

#### INDUSTRIAL COLLABORATION

Basic engineering of Ca-looping system, Gas Natural Fenosa, Spain

Analysis of steam blowing in waste recovery boilers, SAICA, Spain

Design of a preventing fire system by CO2 dispersion, Instalaza, Spain

Economic feasibility analysis of PtG, ERCROS, Spain