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AGENCIA ESTATAL DE INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2017

Turno de acceso general

Nombre: SANCHEZ VALENCIA, JUAN RAMON
Referencia: RYC-2017-22924
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: juanrasv@gmail.com

Título:

Advanced functional composite materials with low dimensionality

Resumen de la Memoria:

The research career of the candidate is focused on the development of new fabrication methodologies of advanced functional nanomaterials. The interest of his research relies on their implementation in nanodevices, which includes sensors, transistors or solar cells, among others. These nanomaterials are of high technological interest since they are fabricated by vacuum and plasma techniques that are scalable to the industry and compatible with the current CMOS device technology.

His specialization area has moved from nanocomposite materials with sensor applications to the fabrication of carbon-based materials, in particular in the surface catalysed bottom-up approach. The large background and knowledge acquired during his PhD and postdoc will allow the candidate to start a new research line entitled in Advanced functional composite materials with low dimensionality. This promising research line will combine different materials either in nature (organic, inorganic) or in properties (optical, electrical, sensoric). The new atomically precise carbon based nanostructures investigated during his postdoc will introduce new hot-topic low dimensional materials (1D-SWCNTs and GNRs) with outstanding properties that, although predicted, have not been investigated in detail yet.

The first step towards his research line Advanced functional composite materials with low dimensionality has been performed with his first project as Principal Investigator (PI), a European Marie Curie project entitled PlasmaPerovSol (158 kEur). In this framework the applicant has combined the carbon nanotubes synthesized during his postdoc in Switzerland with perovskite films deposited by plasma-assisted techniques for the development of next generation solar cells.

The results obtained within this project motivated him to search for financing to continue this innovative research line, with the goal of establishing it in the laboratory of Sevilla. Fruit of his efforts, he has been recently granted by the University of Seville (VI-PPIT, US-2017, Conv. IV.2. Atracción de talento) with a project as PI (40 kEur) to continue the research in low dimensional perovskite based-solar cells fabricated by vacuum and plasma methodologies.

The basic concepts and results of the research have insightful scientific and technical impact in areas such as Nanotechnology, Nanoelectronics, Advanced Materials and Advanced Manufacturing. These areas have been addressed as highly important Key Enabling Technologies in both Estrategia Española en Ciencia, Tecnología y de Innovación 2013-2020 (Sect. 4.3.2) and Horizon 2020 planning.

The goal of the applicant is not only to establish the surface-catalysed bottom-up approach to fabricate carbon based nanomaterials in Spanish laboratories, bringing home the know-how acquired during his postdoctoral period, but to combine them with the knowledge acquired during his PhD and postdoctoral return.

Resumen del Currículum Vitae:

He graduated in Physics in 2005 and started his research career at CSIC with a PhD fellowship in the group nanotechnology on surfaces leaded by A.R. Gonzalez-Elipe. His PhD, focused in the Fabrication of multifunctional nanostructured mixed thin films, was defended in 2010 obtaining the highest mark (sobresaliente cum laude). It is worth mentioning that during his PhD, the applicant finished his second career in Engineer of Materials.

In 2011, he started his postdoc in Switzerland at EMPA, institution belonging to the ETH Domain, currently ranked as 8th best university in the world in engineering, science & technology. He was integrated in the group nanotech@surfaces under the supervision of Roman Fasel to investigate the bottom-up synthesis of carbon based materials by the use of molecular precursors subjected to on-surface controlled chemical reactions.

After 3 and half years, he came back to the group where he developed his PhD, first to work on novel deposition and marking technologies of fluorescent materials for intelligent labelling. Within this framework, he continued the research line developed during his PhD, paying especial attention to the fabrication of one-dimensional materials. During this period he was granted a postdoctoral Marie-Curie project (EU-H2020) to study vacuum and plasma fabrication of perovskite solar cells. The candidate is the Principal Investigator (PI) of this project (granted 158 kEur) that represents the beginning of his research line where he has developed new plasma and vacuum techniques performed in the group of Seville in combination with surface-catalyzed bottom-up techniques of graphene and carbon nanotubes learnt in Switzerland. The important results obtained have enabled him to be granted with project financed by the University of Seville (40 kEur) to continue developing this research.

The candidate has participated in 40 publications in high impact journals, with 95% of the articles in Q1 and 80% in D1 (SCOPUS). He is 1st author in 10 and corresponding in other 5. His works have received 726 citations that have led him to reach an h-index of 16. He has published as the 1st author in leading journals such as Adv. Materials, Nanoscale, Chem. Comm. and NATURE, and 8 of his works has been chosen as covers.

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The industrial collaboration has been present during his career, paying especial attention to technology transfer and IP protection. Fruit of this are 5 PCT patents, 2 of them licensed by the company BASF.
He has contributed to 18 competitive projects (FP6, H2020, national and regional programs) and 5 industrial projects. He has collaborated with world-leading groups in Switzerland (ETH), Germany (MPI) or United Kingdom (Cambridge Univ.). The candidate has demonstrated leading capacities by triggering new research lines within his host groups and securing the funding for his research. In this context he has been granted as PI with a Marie Curie, a project financed by the Univ. of Seville, two synchrotron proposals and a project to access advanced techniques framed within the H2020 project NFFA.
He has supervised 3 master thesis and 1 PhD, and is currently supervising 2 more students (1 PhD, 1 Master). He has participated in 45 conferences (including 12 Orals and 5 Invited) where it can be remarked a senior invited talk and the invitation to give a plenary lecture the next September.

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CONVOCATORIA 2017

Turno de acceso general

Nombre: PRINS , FERRY
Referencia: RYC-2017-23253
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: ferry.prins@uam.es

Título:

Photonic Nanomaterials and Devices

Resumen de la Memoria:

Over the past years, my research has focused on improving the understanding and control over light-matter interactions in excitonic semiconductor nanomaterials. In my work, I combine material development with photonic and optoelectronic device design, as well as detailed spectroscopic investigations that reveal the physics underlying their operation.

In contrast to their bulk counterparts, semiconductor nanomaterials exhibit quantum-confined excited states that are characterized by bound electron-hole pairs, known as excitons. By changing the size, shape and composition of an excitonic material it is possible to fine-tune the degree of confinement and tailor the optoelectronic properties of the system. As a result, excitonic nanomaterials are highly versatile building blocks for efficient, flexible and cost-effective solar harvesting and light emitting devices. Despite rapid progress in the field, questions remain about the influence of local morphology and energetic disorder on exciton dynamics. Moreover, methods to actively control their dynamics have only recently started to emerge. Improved understanding and control over these dynamics may leverage dramatic improvements in the efficiency of next-generation energy and sensing technologies.

Over the course of the past years I have worked extensively on the spectroscopic investigations of excitonic systems, establishing key structure-property relationships. Important in this respect has been the transient microscopy techniques that I developed during my time at the Center for Excitonics at MIT. There I worked in the lab of Prof. Tisdale on energy transfer and exciton diffusion in nanomaterial assemblies. By resolving the spatial dynamics of exciton populations in colloidal quantum dot (cQD) assemblies with nanometer and picosecond resolution, I was able to accurately determine the diffusion of excitonic energy in these materials and develop strategies to control them. In a separate study, I studied anomalous energy transfer dynamics in a hybrid 0D-2D system of cQDs interfaced with few and monolayer MoS_2. In contradiction to conventional Forster theory, the energy transfer efficiency (which exceeds 95% in some cases) increases as the number of MoS_2 acceptor layers decreases, despite the presence of fewer energy transfer pathways.

Since the start of my independent research career, I have expanded my research toward photonic strategies that may provide direct control over the excitonic states. Central to this research is a method I recently developed to structure cQD assemblies with wavelength-scale resolution, allowing for direct patterning of cQD films into photonic crystal and waveguide structures. The combined tunability of the optical properties of the nanoscale cQD building block and the wavelength-scale assembly opens up a wide range of possibilities in controlling the light-matter interactions in these materials. Using circular grating structures, we have already demonstrated highly directional beaming of fluorescence from such structured films, while early results on ring resonator waveguides show record-low lasing thresholds. Beyond this direct patterning strategy, we are combining excitonic materials with plasmonic antennas and nanocavities, where exciton dynamics can be directly probed in the presence of a strongly perturbed optical density of states.

Resumen del Currículum Vitae:

Since 2015, Ferry Prins has been leading an independent research group on Photonic Nanomaterials & Devices. Originally founded at ETH Zurich with support from the Swiss National Science Foundation, his lab recently relocated to the Condensed Matter Physics Center (IFIMAC) of the Universidad Autonoma de Madrid. Ferry has over a decade of experience in material design and characterization, working on a variety of topics such as molecular magnetism, molecular electronics and, most prominently, nanomaterial photonics. His group currently consists of 2 PhD students and 4 undergraduates.

Ferry obtained an MSc (with distinction) from Leiden University in 2007 working on the design and synthesis of molecular magnetic materials under the guidance of Prof. Jan Reedijk. In 2011 he obtained his PhD from the Kavli Institute of Nanoscience at Delft University of Technology under the supervision of Prof. Herre van der Zant. For his PhD thesis, he worked on the development of single-molecule and nanoparticle-based electronic devices. He then joined the group of Prof. William Tisdale at the Massachusetts Institute of Technology at the beginning of 2012, where he led a small team of PhD students on spectroscopic studies of exciton dynamics in nanomaterial assemblies. In 2014 he joined the Optical Materials Engineering Laboratory at ETH Zurich, where he started his independent research career in 2015 thanks to funding from the Swiss National Science Foundation. In further recognition, he was promoted to the position of Lecturer (Dozent) by the Rectorate of ETH Zurich in 2016. In spring 2017 he accepted an offer to expand his research group at the Condensed Matter Physics Center (IFIMAC) of the Universidad Autonoma de Madrid.

He is (co-)author of 29 articles (1 more under revision), many of which in major and interdisciplinary journals (e.g. Nature Materials (1x),

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Nano Letters (7x), ACS Nano (3x), Angew. Chem (2x), Adv Mat. (1x), ACS AMI (1x)). His publications have received >1200 citations to date (avg. > 40 / paper) and he has an h-index of 19 (Google Scholar). He is main author on the majority of his papers (first 10x, senior 6x). He holds 3 patents and technology disclosures. He has given >30 oral contributions at conferences and seminars. He is a regular reviewer for a number of major journals including Nature Comm., Nano Letters, ACS Nano, JACS, and Adv. Mat.

Aside from the 2 PhD theses he is currently directing, he has (co-)directed >25 PhD/MSc/BSc students during their thesis work at ETH, MIT and Delft. As lecturer at ETH, he independently directed two academic courses (total 8 ects).

He has worked in various international collaborative projects, including EU FP6&7 and H2020 (6 total), as well as Dutch, US and Swiss national projects. Personally, he has acquired an equivalent of >1.25 million EUR in funding as principal investigator. He is recipient of various awards, most prominently the Rubicon from the Netherlands Organization for Scientific Research, the prestigious Ambizione from the Swiss National Science Foundation, and the Atraccion de Talento from the Comunidad de Madrid.

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Nombre: FINA MARTINEZ, IGNASI
Referencia: RYC-2017-22531
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: ignasifinamartinez@gmail.com

Título:

Materiales ferroeléctricos y antiferromagnéticos para la electrónica

Resumen de la Memoria:

During my career I focused on two main research lines: the study of ferroelectric oxides materials (in the framework of different research areas: multiferroics, photovoltaics, neuromorphic computing and materials integrated on silicon) and of antiferromagnetic materials for spintronic applications. My first research line results as a continuation of my PhD thesis work (except for the work related with photovoltaics, which I started independently). My own interests in distinct-novel applications (security and robust data storage) have triggered the second research line. Antiferromagnetic materials, replacing and not as subsidiary element of the ubiquitous ferromagnetic materials in data storage devices, can hold the new distinct-novel properties that I am looking for.

Currently, I am mainly working at Institut de Ciencia de Materials de Barcelona (ICMAB-CSIC) as a project leader of a Spanish National project: #ESRAM, in which I merge my experience on ferroelectrics and antiferromagnets (MAT2015-73839-JIN, funded with 169.5k€ by the Spanish government via MINECO). I also supervised 1 PhD thesis (another currently), 1 master thesis (another currently), and mentored 2 more PhD students.
My leading position on my research lines can be also evaluated by the fact that I am main author in 65% of my papers (I am first author in 17, second author in 13, and corresponding author in 20 of them). Now I list some of my most relevant publications: Applied Physics Letters 97, 232905(2010) and Physical Review Letters 107, 257601 (2011), these publications result from my PhD thesis; Nature Materials 13, 367 (2014), Nature Communication 5, 4671 (2014), and Advanced Materials 26, 7078 (2014), which result from my independent research started during my postDocs in Europe; and Scientific Reports 7, 15460 (2017), and ACS Appl. Mater. Interfaces 9, 15577 (2017), which result from my currently led project #ESRAM.

The relevance of my work has allowed me to attract the attention of industrial partners for the development of Technology Transfer projects. Also, very relevant has been my work leading the development of the Dielectric and Ferroelectric characterization Laboratory at ICMAB-CSIC, which now is partially used as a service for scientists from ICMAB and also from other international institutes. Mention also that 82% of my published papers belong to the Q1.

My work recognition has come obtaining very competitive fellowships (Juan de la Cierva, Beatriu de Pinós A, Beatriu de Pinós B, Alexander VonHumboldt), which allowed me to independently focus on my own research interests. The First Young Researcher Prize of the Biennial Meeting of the Spanish Physics Society also recognizes my trajectory. I have also been invited to several international conferences (7 invited talks and 1 plenary talk) and to international Research Institutes or Universities (6 invited talks). I have also given other 22 talks at international conferences.

I have obtained 195.500€ with 1 national project, 1 international (non-EU) project and 1 national fellowship additional funding. I have also obtained 45.000€ from technology transfer projects, and all the fellowships that I obtained sum up an amount of 250.500€. Overall, I obtained approx. 500k€ from different funding sources.

Resumen del Currículum Vitae:

I published 46 papers, some of them in very high impact journals: Nature Materials, Nature Communications, Advanced Materials, Physcal Review Letters, among others and 82% of them belong to the 1st quartile. I have an h-factor of 16 and more than 800 citations (WOS). I published two book chapters and I will soon publish a third one. I presented my work giving more than 30 talks in scientific international conferences.

I led two technology transfer projects with industry, both continuation of previous research projects, and I participated and led, respectively, the development of two prototypes, also as part of my research.

Regarding my international activity, I participated in 4 European and 1 German projects. Moreover, the Laboratory headed by myself is integrated in the NFFA European program, which groups several European facilities for industrial and academic research puroposes. I have one year of experience in a German Laboratory, one more in a British one (in both I started most of my independent research activities and published very relevant works), and short stages in Laboratories in Brazil and Germany. I have a good international network with

colleagues from: BerkelayLab from California, USA (R. Ramesh, h-factor=111, with who I have co-authored 3 papers), Academy of Sciences of the Czech Republic (T. Jungwirth, h-factor=54, 6 co-authored papers), Warwick University from UK (M. Alexe, h-factor=50, 7 co-authored papers), Ecole Centrale Paris from France (B. Dkhil, h-factor=42, 3 + 1 in production co-authored papers), Politecnico di Milano from Italy (R. Bertacco, h-factor=25, 7 co-authored papers), among others (as it can be inferred from my publication list). I am still expanding my international network with people from f.i. MPI (R. Jaramillo, with who I co-led project) or U. Pennsylvania (A.M. Rappe, with 1 co-authored paper still not published).

I have a high activity regarding broad audience dissemination actions. I have participated in several dissemination activities (Nanoeduca, Bojos per la Física, ESCOLAB,), including the development of dissemination kits for high school students (a piezoelectric sensor that students can set-up themselves). I also participated in 4 radio interviews (1 national radio station, and 3 local), and my research activity appeared in general newspaper.

Other curricular achievements that I would like to highlight are the followings. I am teaching (at Bachelor level of physics degree) as associate professor in Universitat de Barcelona. I have been awarded with high competitive fellowships (Juan de la Cierva, Beatriu de Pinós A, Beatriu de Pinós -b, Alexander VonHumboldt). I was also co-founder of IGSjump, SMU with the aim of building bridges between academia and industry. During the last years, I have been granted with more than 25 days in synchrotron facilities. I am frequent reviewer in journals such as Nature Physics, Nature Communications, Journal of Materials Chemistry C, , evaluator in the Spanish National Agency of Evaluation (ANEP) and in the PRIME program (Germany), and advisor in the Technology Transfer Commission at ICMAB and for IGSresearch. I was main organizer of 1 conference (organizer in 4 more), and soon I will organize 1 international symposium.

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Turno de acceso general

Nombre: KOSAKA MONTEIRO, PRISCILA
Referencia: RYC-2017-21640
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: priscila@imm.cnm.csic.es

Título:

Merging nanomechanical systems with other nanotechnologies to create tools for the discovery of new cancer biomarkers in blood and for sensitive and selective diagnosis of fatal diseases

Resumen de la Memoria:

B.Sc. in Chemistry by the University of Brasilia (Brazil) in 2002. During this period I was awarded with a scholarship for the scientific initiation of undergraduate students. After my graduation, I moved to São Paulo to start my doctoral studies. Ph.D in Physical Chemistry by the University of Sao Paulo (Brazil). My Ph.D. thesis was focused on the thermodynamic stability of thin cellulose ester films for future biomedical applications. Today, the theme of my PhD thesis became one of the research lines of this group Ph.D. Thesis finished on February 14th, 2008.

After my Ph.D. I moved from Brazil to Spain in 2008 for my first post-doctoral stay in the Bionanomechanics Lab. The techniques and knowledge acquired during my PhD were key for the total integration in the host group. During this period, I developed a label-free biosensor for the detection of DNA and worked on the development of optical instrumentation for the measurement of nanomechanical systems.

In 2011, with a contract Juan de la Cierva, I continued to working on the development of optical instrumentation for measurement of biomolecular interactions. However, my main interest has always been the development and optimization of immobilization strategies in nanomechanical devices for biosensing. I performed the first large nanosensor statistical study to address the problem of reproducibility in label-free nanomechanical sensors in order to approximate the use of these sensors to biochemistry labs and clinical use.

In November, 2014 I published a new concept of hybrid mechanical and optoplasmonic nanosensor capable of detecting cancer biomarkers in serum with an unprecedented detection limit of 100 g / mL. This nanosensor has an error rate of just 2 out of 10,000 trials. To achieve this, my experience in surface chemistry along with the knowledge gained during my postdoc in nanomechanics have been key. This discovery opened a new research line in the Bionanomechanics Lab that I lead. In 2015 I applied for an ERC-Starting Grant related to this subject and I was a successful Step 1 applicant. In this same year, I was awarded the ComFuturo project at CSIC with project in this research line for breast cancer diagnosis (1 award in my field) and I am also co-PI of a project given by the AECC for the detection of lung cancer. I am co-directing a Ph.D. thesis in this research line since March, 2016. This year this same hybrid sensor could detect 10 ag/mL of p24 protein. The p24 is present in the blood of recently HIV infected people. The sensitivity achieved can reduce the eclipse phase of HIV to just 1 week. I have just started to co-direct a thesis for the detection of HIV in newborns.

I co-directed a doctoral thesis entitled "Study of the mechanical properties of oligonucleotide monolayer and their application for the detection of pathogenic microorganisms" (15/12/16, Cum Laude). In 2013 and 2014 I supervised two international Ph.D. students.

I am evaluator of proposals and reviewer of projects for the European Commission and FONDECYT (Chile). I am part of the editorial board in Translational Material Science and of the Scientific Advisory Board of Mecwins. Guest editor of the special issue about nanomechanics in Journal Sensors (2015) and Micromachines (2017). In 2014, I was co-chair of the most prestigious conference in nanomechanics.

2 TEDx talks, 1 Campus Party Talk.

Resumen del Currículum Vitae:

Research lines: Hybrid nanosensors for early cancer detection and infectious diseases, discovery of cancer biomarkers, biosensors, nanomechanics, plasmonics, optical instrumentation

Specialization: Surface chemistry, surface functionalization for immobilization of biomolecules, atomic force microscopy, ellipsometry, contact angle, physical chemistry

CURRENT POSITION

ComFuturo Researche since September, 2015.

Bionanomechanics Lab, IMM-CNM-CSIC

EDUCATION AND AWARDS

- Graduated in Chemistry from the University of Brasília (UnB, Brazil) on May 02, 2002
- PhD in Physical-Chemistry, Thesis "Applications and Characterization of Cellulose Esters" by the University of São Paulo (USP, Brazil) on February 14, 2008. Thesis Advisors: Prof. Dr. Denise FS Petri and Prof. Dr. Yoshio Kawano.
- Award in recognition of my commitment to the dissemination of technological and educational advances. City Hall of Goiânia, Brazil, 10/21/2015.
- Finalist of the "2nd Brazilian Diaspora Award - The brazilian talent that inspires the world", which aims to recognize the Brazilian talents involved with science, technology, innovation and entrepreneurship that contribute to the construction of a positive image of Brazil abroad
- July, 2017: Nominated to the Humanity in Science Award by Prof. Dr. Thomas Thundat

(State University of New York at Buffalo (USA))
PREVIOUS POSITIONS
-2014 -August, 2015: Postdocotoral research (ERC StG NANOFORCELLS)
Bionanomechanics Lab, IMM-CNM-CSIC, Spain
-2011 - 2013: Postdocotoral research Juan de la Cierva
Bionanomechanics Lab, IMM-CNM-CSIC, Spain
-2008 - 2010: Postodoctora research JAE-Doc
Bionanomechanics Lab, IMM-CNM-CSIC, Spain
-2003-2008: Ph.D. student. Ph.D. grant from the National Council for Scientific and Technological Development (CNPq, Brazil)
University of Sao Paulo, Institute of Chemistry, Brazil
2001-2002: Undergraduate student. Fellowship for the scientific initiation of undergraduated students from the National Council for Scientific and Technological Development (CNPq, Brazil)
University of Brasília, Faculty of Technology, Brazil

MY ACTIVITY IN NUMBERS
Publications: 36
Invited Reviews: 3
Book chapter: 3
Texts in magazines for the general public: 3
H-index: 16
i10 index: 24
Citations: 891
Patents: 6 (5 licensed and 3 granted)
Invited talks in conferences ans seminars: 9
Invited talks to a general public: 2 TEDx Talks, 1 Campus Party main stage, 1 PHD Media event
Oral presentations in conferences and workshops: 8

PRINCIPAL INVESTIGATOR IN PROJECTS: 2
- Project title: Ultrasensitive nanosensor for the early detection of breast cancer
Fundación General CSIC, ComFuturo Program
PI: Priscila Monteiro Kosaka
Total Amount: 159.000 euros
- Project title: Detection of gene-fusion proteins in blood by optomechanoplasmonics for early cancer detection and personalized medicine
Asociación Española Contra el Cáncer - AECC
PI: Javier Tamayo and Priscila Monteiro Kosaka
Total Amount: 159.000

PARTICIPATION IN RESEARCH PROJECTS: 14 (key personnel in 2 of them)

TEACHING ACTIVITIES
Ph.D. Thesis finished: 1 (15/12/2016, Cum Laude)
Master finished: 1 (14/09/2017, grade 9,2)
Ph.D. Thesis in progress: 2 (1 since March, 2016 in cancer biomarkers discovery and 1 since October 2017 in detection of HIV in newborns)
Supervision of international Ph.D. students: 2
Classes and/or courses: 3

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Turno de acceso general

Nombre: BARJA MARTINEZ, SARA
Referencia: RYC-2017-21931
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: barja.sara@gmail.com

Título:

Novel physical phenomena in two-dimensional materials

Resumen de la Memoria:

My research expertise focuses in the field of experimental Condensed Matter Physics, with emphasis on the atomic scale study of novel physical phenomena in two-dimensional (2D) materials. My research also spans the fields of 2D metal-organic lattices, molecular photo-switching, surface catalysis, transport in quantum dots and state-of-the-art instrumentation.

My interest in 2D systems is two-folded: first, the understanding of the evolution of the fundamental properties of novel layered material related to their electronic structure- when reducing their dimensionality from bulk to single-layer; second, the understanding the role of structural defects on the electronic structure of 2D-materials, not only to optimize the material's intrinsic properties, but also as a route to engineer new ones.

Since 2016, I am Ikerbasque Fellow at Centro de Física de Materiales, CFM (San Sebastián, Spain), where I manage three different projects devoted to the study of the properties of two dimensional (2D) materials at the atomic scale: i) the study of the electronic properties of 2D materials at the atomic scale; the exploration of novel 2D materials in surface catalysis; and iii) the growth and characterization of 2D donor-acceptor nanostructures. Currently, I am the principal investigator and coordinator of 3 R&D projects; and the supervisor of 2 master, 3 undergrad and 1 PhD students.

In 2013 I was awarded with the International Outgoing Fellowship Marie Curie Action on the project "Investigating Photo Catalytic Reactions at the Molecular Scale" developing two years of research at the Lawrence Berkeley National Laboratory in Berkeley and one year at the Max Planck Institute for Solid State Research (MPI-FKF) in Stuttgart. In Berkeley I initiated a research line on the characterization of 2D transition metal dichalcogenide semiconductors properties at atomic scale. The main research line on 2D-TMD semiconductors was focused on the role of intrinsic defects on the material's properties. I provide direct evidence for the formation of 1D charge density wave order along macroscopically extended networks of one-atom-thick mirror twin boundaries embedded in 2D semiconductors (Barja, Nature Physics 12, 751 (2016)). I also covered the study of point defects on single layered MoSe2, transport behavior of PbS quantum dots films and 2D organic-inorganic hybrid perovskites.

During my PhD (2007-2012) at the Universidad Autónoma de Madrid (Spain) I carried out a broad study about the influence of the metallic substrate on the electronic and structural properties of graphene and 2D metal-organic networks (overall of 19 publications). My work revealed the formation of a the potential energy landscape for electrons in graphene grown on Ru(0001), dictated by modulation of the interaction with the metallic substrate due to the formation of a moiré pattern. A second research line on graphene related to its functionalization, for what I studied two different strategies: the formation of long-range ferromagnetic order in 2D organic system adsorbed on graphene and the enhancement of the spin-orbit interaction in graphene by proximity to Pb islands. I also reported the formation of a magnetic 2D metal-organic coordinated network, by using a self-assembled supramolecular structure as a template to organize magnetic adatoms at specific sites.

Resumen del Currículum Vitae:

Since 2016, I am Researcher at the Materials Physics Center "MPC- (UPV/EHU-CSIC center) awarded with a merit Ikerbasque Research Fellowship and Invited Donostia International Physics Center (DIPC) Associate researcher. There I manage a project devoted to the study of study of the properties of two dimensional (2D) materials at the atomic scale. I am principal investigator and coordinator of 3 R&D projects, and the principal investigator of 3 User Facility proposals at the Molecular Foundry (LBNL). I am lecturer at the Master in Nanoscience at the UPV/EHU. I have co-mentored 5 master students and 1 PhD student, and I am current director of 3 undergrad, 2 master and 1 PhD students. In 2017 I was conference chair of the DIPC School on "Photolectrocatalysis at the atomic scale" (San Sebastián) and co-organizer of the Iberian Vacuum Conference, RIVA-X (Bilbao).

In 2012 I obtained the PhD degree in Physics with highest honors (Cum Laude) at the Universidad Autónoma de Madrid (UAM), under the supervision of Prof. Rodolfo Miranda and Prof. Amadeo L. Vázquez de Parga. My PhD thesis received the 2012 PhD Special Award from the UAM. During my PhD I was granted through the FPU program (Pre-doctoral merit fellow) from Spanish Ministry of Education and coordinated several research collaborations with international groups at the Freie Universität Berlin (Germany) and the University of Basel (Switzerland).

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In 2012 I moved to the group of Prof. Salmerón at the Lawrence Berkeley National Lab (LBNL) awarded by a US Department of Energy Postdoctoral grant. In 2013 I was awarded with the International Outgoing Fellowship Marie Curie Action on the project Investigating Photo Catalytic Reactions at the Molecular Scale developing two years of research at the Molecular Foundry/LBNL (Dr. A. Weber-Bargioni s group) in Berkeley and one year at the Max Planck Institute for Solid State Research (MPI-FKF) (Prof. Kern’s group) in Stuttgart.

I am author in 24 peer-reviewed publications in high-impact journals (including 3 Nature Physics, 3 Physical Review Letters, 2 ACS Nano, 2 Nano Letters and 1 Advanced Materials), with so far 650 citations (H-index of 13). I participated in 24 contributions to conferences and seminars, including 4 invited seminars and 2 invited talks in international conferences [Spring MRS meeting 2017 (Phoenix, AZ), AVS-64 2017 (Tampa, FL)]. 2 more invited talks have been accepted in 2018 [APS March meeting (Los Ángeles, CA) and VIII encuentro de Física y Química de Superficies (Argentina, plenary talk)]. Overall I carried out 46 months in forefront research centres and universities such as UC Berkeley/LBNL (USA), MPI-FKF (Germany), Freie Universität in Berlin (Germany) and University of Basel (Switzerland). I am principal investigator in three User Facility proposals at the Molecular Foundry (LBNL) and the chair organizer of a DIPC School (San Sebastián). I am also involved in the organization of outreach activities, participating as invited speaker in ¿Qué sabemos de...? CSIC seminar series and Naukas San Sebastián 2018.

I am reviewer of high impact journals such as Angewandte Chemie, NanoLetters, Journal of Physics: Condensed Matter, The Journal of Physical Chemistry and Chemistry and Applied Surface Science. In 2017 I participated as evaluation committee of the 1 PhD thesis at the UAM, and 2 Master Thesis at the UPV.

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Turno de acceso general

Nombre: MOHEDANO SANCHEZ, MARTA
Referencia: RYC-2017-21843
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: mmohedan@ucm.es

Título:

Advanced Multifunctional Surface Treatments for Corrosion Protection

Resumen de la Memoria:

Dr. Marta Mohedano completed her PhD in Materials Science and Technology (Extraordinary Award) from Complutense University of Madrid-UCM (Spain) in 2011 with the support of a UCM Pre-doctoral Fellowship, including predoctoral stays at the University of Cambridge (UK) for 6 months. She then continued at the UCM with a postdoctoral research contract until 2013, when she got the prestigious Humboldt Research Fellowship for Postdoctoral Researchers (24 months) and moved to Helmholtz Zentrum Geesthacht-HZG (Germany). After 32 months at HZG, she reincorporated to UCM in June 2016, firstly as a Juan de la Cierva Incorporación Fellow and then, since February 2017, as a Principal Investigator of the national project MAT2015-73355-JIN (Proyectos I+D+i para Jóvenes Investigadores), under the umbrella of the National Programme for Research Aimed at the Challenges of Society.

Her scientific output includes 57 publications (55 papers - 37 Q1 -, 1 review -Q1- and 1 book chapter, 13 as first author) in international peer-review journals (131 cumulative impact factor, >850 citations -144 per year in the last 5 years- and h-index= 21 (Google Scholar) 19 (Scopus)), 36 communications (22 oral) at 27 International (1 invited talk in the Open Ceremony at Eurocorr 2015) and 9 National conferences, participation in 11 research Projects (3 European, 4 National, 2 Regional and 2 linked to Fellowships), 14 technology transfer Contracts and 1 Utility Model. In 2015, she was awarded the international EFC-Kurt Schwabe Prize, presented every three years to a young scientist below 35 years of age in recognition of his or her scientific and technical contribution to the field of corrosion. She has contributed to more than 350 h of lectures at UCM and HZG (including training and supervision of a total of 17 bachelor/master students) and has participated in scientific committees (Young EFC, Advanced Chemistry Symposium), dissemination activities (Escuelab, In-school workshops) and revision of manuscripts (Corr. Sci, JES, Surf. Coat. Tech, etc.)

Her research interests lie in topics such as alloy engineering, tailoring of surfaces of light alloys (Mg, Al and Ti) and detailed corrosion studies in different environments for transport and biomaterials applications. Specific lines of research include minor alloying of Mg and Al alloys, thermal spraying of Al-based coatings and advanced surface treatments based on plasma electrolytic oxidation and their functionalization. The development of biodegradable implant materials and low-cost Cr(VI)-free self-healing coatings are among the most recent research activities of the candidate. Dr. Mohedano is highly skilled in the fundamental and strategic study of ceramic-like coatings, materials characterization and corrosion evaluation by state-of-the-art techniques (AFM, SEM, XPS, TEM, XRD, EDX, electrochemical tests) and cutting-edge technologies such as Kelvin probe force microscope, SVET and nanoindentation

Resumen del Currículum Vitae:

A) Education
- 2006 Chemical Engineering, Alfonso X El Sabio University (Spain)
- 2011 PhD in Materials Science and Technology, Complutense University of Madrid (UCM, Spain). Maximum qualification: Sobresaliente Cum Laude, Extraordinary Doctorate Award.

B) Scientific output
- 57 publications: 55 scientific papers (37 Q1), 1 review (Q1) and 1 book chapter, 13 as first author. 131 cumulative impact factor, >850 citations, 144 cites per year in the last 5 years and 21 (Google Scholar) 19 (Scopus) h-index.
- 36 communications (22 oral) at 27 International (1 invited talk in the Open Ceremony at Eurocorr 2015) and 9 National conferences.
- 11 Projects (3 European, 4 National, 2 Regional and 2 linked to Fellowships). Currently IP of the project MAT2015-73355-JIN.
- 14 technology transfer Contracts.
- Co-author in 1 utility Model.

C) International activities/visibility
- Two pre-doctoral stays (6 months) in The Composites and Coating group, Department of Materials Science and Metallurgy at the University of Cambridge (UK).
- Post-doctoral research associate at Helmholtz Zentrum Geesthacht (Germany) as a Guest scientist (8 months) and a Humboldt Fellow (24 months).
- Participation in 2 European funded R&D projects: MULTISURF and ALMAGIC.
- Coordinator of a non-funded international project (NOVOMAG) between Helmholtz Zentrum and the Complutense University of Madrid.
- 2015 EFC Award-Kurt- Schwabe Prize (awarded every 3 years to a young scientist below 35 years of age in recognition of his or her scientific and technical contribution to the field of corrosion).

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 Invited speaker at the opening ceremony of Eurocorr 2015 (Europe s most renowned and the largest scientific corrosion event).
 Member of the Young EFC board (an initiative that supports young researchers and engineers in the field of corrosion and protection of materials) in charge of organizing workshops for the young community and attending periodic meetings of EFC and STAC (Scientific and Technical Advisory Committee).
 Reviewer for different Journals e.g Corrosion Science, Journal of The Electrochemical Society, Surface and Coating Technology, Applied Surface Science, Materials and Design, etc.

D) Grants, Prizes, mentions and distinctions
 2008: UCM-predoctoral Fellowship.
 2009 and 2011: Honorific Collaborator. Dpt. Material Science and Metallurgical Engineering, UCM.
 2011: Grant for short stays in a foreign country, UCM (Spain) and Cambridge University (UK).
 2011: Extraordinary Doctorate Award.
 2013: Humboldt Fellowship for post-doctoral researcher.
 2015: EFC Award-Kurt Schwabe Prize.
 2016: Juan de la Cierva Incorporación _MINECO.

E) Lecturing, student supervision and outreach
 More than 350 h of lectures at UCM.
 Training and supervision of a total of 17 bachelor/master students.
 Participated in scientific committees (Young EFC, Advanced Chemistry Symposium).
 Dissemination activities (Escuelab, In-school workshops).

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Turno de acceso general

Nombre: QUESADA MICHELENA, ADRIAN
Referencia: RYC-2017-23320
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: alkendor@hotmail.com

Título:

Control of magnetism at the interface of nanostructured materials

Resumen de la Memoria:

Working in the field of experimental condensed matter physics, I have focused my research career on magnetic materials. In particular, I have studied magnetic coupling phenomena at the interface and surface of nanostructured materials that lead to novel functionalities. My background includes fabrication and advanced characterization of fundamental model systems, as well as expertise in transferring novel phenomena and functionalities onto larger scale bulk systems.

During the PhD I learned to characterize and correlate structural, electronic and magnetic features of bulk systems at the interface between non-magnetic oxides. In my postdoctoral stage, I focused on a more basic approach. In particular, the careful balance of anisotropies that govern the magnetic behavior of a given system and how they are affected when critical dimensions are reached. I employed epitaxial ultrathin-films as model systems, both oxide-based and metallic. It is worth noting that LEEM-PEEM and especially SPLEEM (with only 3 operating microscopes worldwide) are powerful and unique techniques that are becoming increasingly relevant and sought after, but also exotic since there exist few instruments. In this sense, I could be considered one of the very few experts in Spain in LEEM-PEEM and SPLEEM.

Since December 2011, I have been performing my research activity at the Instituto de Cerámica y Vidrio, CSIC in Madrid, up until December 2014, under a Juan de la Cierva program. I participated in a project proposal for the Seventh Framework Program (my contribution included writing the scientific description of the proposal) which resulted in the project NANOPYME that started in December 2012 in which I acted as a Work Package Leader. Since 2013, I have supervised 3 end of degree projects. The 3 month project yielded a publication. During the same time, I became a frequent user of both ALBA and BESSY synchrotron facilities, at the LEEM-PEEM beamlines, with a record of 8 accepted proposals as main proposer since.

In the last year, having integrated the knowledge from the relatively different areas from my research career, I have started leading my own research line on magnetic nanostructured materials within the Ceramic for Smart Systems Group. An experiment performed from one of my accepted proposals at the synchrotron ALBA won the 2014 Experiment of the Year Award from the ALBA synchrotron. The work was published in Advanced Materials.

As a leader of the line, I coordinated a consortium composed of 6 research institutions and 5 companies for an application to a Research and Innovation Action within the NMBP-03-2016 Call of the European Commission. I designed and wrote most of the proposal. The project is called Anisometric Permanent Hybrid Magnets based on inexpensive and non-critical materials (AMPHIBIAN) and aims at substituting rare-earths in permanent magnets for applications in the electric power system. The 3 year project, of which I am the Project Coordinator, has been approved for funding with 4,948,707.50 (CSIC budget amounts to 865,247.50) and started in January 1st 2017. In the framework of AMPHIBIAN, I am conducting and directing my first PhD Thesis as an advisor.

Resumen del Currículum Vitae:

Adrian Quesada expertise spans the study of magnetic properties from ultrathin film model systems up to bulk systems for industrial applications, in a technology-transfer-driven approach. He obtained his PhD in 2009 studying the magnetic properties of magnetic semiconductors and working under the direction of Dr. Miguel Ángel García. Adrian went on to a postdoctoral stay at the Lawrence Berkeley National Laboratory, working under the supervision of Dr. Andreas Schmid and being responsible for the Spin-Polarized Low Energy Electron Microscopy (SPLEEM) laboratory. The SPLEEM lab operates as a user facility, which brought the candidate the chance to interact with many scientists from across the globe, leading experts in their field in many cases. Besides becoming an expert in this powerful and unique technique, Adrian Quesada deepened his knowledge on magnetic materials. He received a Juan de la Cierva contract from the Spanish administration and started working in December 2011 at the Institute of Ceramic and Glass in Madrid. Adrian worked from 2012-2015 in a European project within the FP7 program, where he played an important role as a Work Package Leader.

Having integrated the knowledge acquired from the different periods of his career, he is now turning his training years into more prolific scientific production and leadership. He leads a research line on magnetic coupling phenomena at the interface of nanostructured functional materials within the Ceramic for Smart Systems Group at the Institute of Ceramic and Glass (CSIC) in Madrid. He recently designed, organized and led an application for a European Project within the Horizon 2020 program that has been approved for funding. As a consequence, Adrian Quesada is now the Project Coordinator of the H2020 AMPHIBIAN Project (H2020-NMBP-03-2016-780253) funded with 4,948,707.50 euros that started on January 1st 2017.

Publications include 40 articles (38 published + 2 accepted) in peer-reviewed journals (13 as first and/or corresponding author), reaching 1080 citations and an H-index of 13. In particular, 2 articles have reached over 200 citations. 2 non-reviewed articles and a book chapter on SPLEEM complete his publications list. Moreover, he has attended 64 international conferences and imparted 3 invited presentations. He

received a Best Poster Award (MRS 2008). He was part of the team awarded the 2014 Experiment of the Year Award of the synchrotron ALBA. The CV includes two families of worldwide patents.

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Turno de acceso general

Nombre: HERNANDEZ SANTANA, MARIANELLA
Referencia: RYC-2017-22837
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: marherna2010@gmail.com

Título:

Development of elastomer compounds according to circular economy principles

Resumen de la Memoria:

At the start of my career at Petróleos de Venezuela S.A. my work was centered on processing and applications. I focused on the development and standardization of products for the Building & Construction Industry, with the accomplishment of 10 new national technical standards.
At Simón Bolívar University, I established a new research line on the development of elastomer compounds. I was PI of 3 projects worth 100.000 . Thanks to the results of this line (11 published articles) I was promoted to the category of Associate Professor.
As part of my PhD I studied the molecular dynamics of rubber nanocomposites. One noteworthy result was the appearance of a new relaxation in the dielectric spectrum of the nanocomposites. Such relaxation was attributed to the restricted segmental dynamics of rubber chains located at the clay/rubber interfacial region. This represents a major contribution from the point of view of rubber/filler interactions within elastomer nanocomposites and it is fundamental for understanding why the reinforcing effects in nanocomposites are manifested at low filler loadings. I also studied the effect of strain-induced crystallization by correlating dielectric relaxation spectroscopy with wide-angle X-ray scattering.
As a Marie Curie Fellow, I was successful at developing for the first time a new sulfur-cured rubber compound with self-healing properties. A compromise between mechanical performance and healing capability was found; such compromise can be potentially tailored depending on the amount of sulfur, the crosslinking density and the time of initial contact between damaged surfaces. I also introduced broadband dielectric spectroscopy for the first time as a new and powerful technique to monitor network and macroscale damage healing in elastomers.
As PI I am currently working on the development of eco-friendly self-healing elastomers with the inclusion of waste rubber. My preliminary results show that in presence of a coupling agent the mechanical strength of waste rubber filled compounds improves 80% while keeping healing efficiency around 40%, defeating the challenge of reaching good repairability with no detriment on mechanical performance.
The research line I have carried out along my scientific career lies within the circular economy framework. With the aim of using renewable, reusable, non-toxic resources I analyzed the potential use of green fillers in rubber matrices. I studied the dynamic vulcanization process as a viable alternative for improving thermoplastic s physical properties and processing. I developed composite materials adding recycled products, evaluating the properties of the reprocessed products and transforming recyclable waste into a flourishing market of secondary raw materials. I characterized rubber nanocomposites in-situ by means of broadband dielectric spectroscopy to understand rubber-filler interactions. The correlation between structural magnitudes, physical interactions and dynamic parameters can explain the enhancement of mechanical properties of nanocomposites with low filler loading of nanofillers obtained from natural resources. Finally, I developed self-healing elastomers studying the feasibility of using healing concepts previously applied in other types of materials, monitoring the healing process at molecular level, and thus extending the regular lifecycle of the end product.

Resumen del Currículum Vitae:

My work over the past several years has built on diverse expertise in processing and structure/property relationships in thermoplastics and elastomers. My professional career started working as Researcher at the Institute of Research and Technology of the state-run oil company Petróleos de Venezuela S.A. (Caracas, Venezuela, 1990-1998). This period represented a unique opportunity to gain experience in polymers processing and applications, as well as industrial applied research competences. I then held the position of Associate Professor at Simón Bolívar University (Caracas, Venezuela, 1999-2010) covering all the aspects related to a university position: teaching courses in the areas of processing and technology of plastics and elastomers, supervising Materials Engineering undergraduate students, developing a research line on elastomer compounds and participating in several R&D projects. I took a Sabbatical year internship at the Polytechnic University of Cataluña (Barcelona, Spain-2005) working with Dr. O. Santana on fracture mechanics of elastomeric compounds. Later on I was awarded with a Misión Ciencia pre-doctoral scholarship from the Venezuelan Ministry of Science and Technology and joined the Institute of Polymer Science and Technology ICTP-CSIC (Spain) as PhD Student (2008-2012) under the supervision of Prof. M.A. López-Manchado and Prof. T. Ezquerra. My challenge was to study the molecular dynamics of rubber nanocomposites in order to comprehend the physical relations between the phases in the nanocomposite at a molecular level. I continued as post-doctoral Researcher (2013) studying the dielectric behavior of nanostructured materials. I was then awarded with a Marie Curie Fellowship (2014-2016), working at Delft University of Technology (the Netherlands) with Prof. S. van der Zwaag. My topic was the development of self-healing elastomers. My ambition was to restore various functionalities, as well as to monitor in-situ the healing process at a scale close to the relevant molecular processes by using a molecular dynamics approach. In 2017 I moved back to Spain thanks to a project as Principal Investigator given by the Ministry of Economics and Competitiveness. I am currently a Senior Contracted Researcher at the ICTP-CSIC. My aim is to develop eco-friendly self-healing elastomers with the inclusion of waste rubber.

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I¿ve been PI of 6 projects with grants from public and private sources, I□m author of more than 50 publications in scientific journals and books with h-index=15. I have supervised more than 40 final year projects, 5 MSc (1 in course), 1 PdEng and 1 Phd in course. I have participated in more than 70 national and international meetings, and in several outreach initiatives divulgating my research through social media and popular science articles. I have also been official peer reviewer of international journals and R&D projects. I received a PhD thesis □Honorable Mention Award□ delivered by the Spanish Association of Composite Materials AEMAC (2013) and the accreditation of Doctor Contracted Professor from ANECA (2012). These are all strong evidences that I am a productive and independent researcher.

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Nombre: NAVAS OTERO, DAVID
Referencia: RYC-2017-22820
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: davidnavasotero@gmail.com

Título:

Ferromagnetic and magnetoplasmonic nanostructured materials for data storage, solar energy and bio-medical applications

Resumen de la Memoria:

My research line is focused on the field of Nanomagnetism. In particular, I work on the preparation, characterization, and simulation of low-dimensional nanostructured ferromagnetic and magneto-plasmonic materials with potential applications in fields such as data-storage, solar energy and bio-medical applications.
During my PhD at Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC, Spain) and my pre-doctoral stays at the Max Planck Institute of Microstructure Physics (Germany), I worked on the preparation and characterization of well-ordered electrodeposited nanowire arrays into porous anodic alumina templates and free-standing ferromagnetic antidot arrays. The samples were prepared by combining self-assembly and polymer replica/antireplica processes, with electrodeposition technique. Upon completion of my PhD, I moved to the Massachusetts Institute of Technology (MIT, USA) to improve my skills on the fabrication and characterization of artificially nanostructured films by top-down processes. My work was focused on the study of ferromagnetic nanostructures with perpendicular anisotropy, such as CoCrPt, and their potential application as a new generation of high-density perpendicular recording media. In June 2009, I joined the Universidad del País Vasco (UPV/EHU, Spain) for the set up and improvement of a laboratory for the fabrication and characterization of magnetic nanostructures. Moreover, I led a research line based on the study of ferromagnetic nanostructures using Polarized Neutron Reflectivity measurements at ILL (France). Up to this point, I studied several kinds of nanostructures as potential candidates for data storage applications using my skills on the fabrication of nanostructures by different methods, since self-assembled to top-down techniques, the characterization of their related static magnetic properties as well as micromagnetic simulations.
Nowadays, and as technology is demanding for energy efficient devices and with higher and higher data-transfer rates, a deeper understanding of the nanostructures dynamical properties is required. In order to achieve this goal, I joined the Universidade do Porto (IFIMUP-IN, Portugal) in April 2013 for leading the study of the dynamical properties of ferromagnetic (1D- and 2D-magnonic crystals) and magneto-plasmonic nanostructures using VNA-FMR and ultrafast pump-probe spectroscopy. For this purpose, I am working on the development of an ultrafast pump-probe spectroscopy system with unprecedented temporal resolutions of ≈10fs. Moreover, I am also involved in two European projects (Co-PI in one of them), related to novel magnetic nanostructures for biological and biomedical applications, as well as two Portuguese projects (PI in both of them) related the development of magnetoplasmonic nanostructures for data storage and solar energy applications.

Resumen del Currículum Vitae:

I am currently researcher at the Instituto de Fisica dos Materiais da Universidade do Porto (IFIMUP-IN, Portugal). Just after I received my diploma in Physics Science from Universidad Autonoma de Madrid in 2002, I started my research activity at the Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC, Spain) under the supervision of Prof. M. Vázquez and Prof. M. Hernández. During this stage, I performed two research stays at Max Planck Institute of Microstructure Physics (Germany) under the supervision of Dr. K. Nielsch. Afterwards, I moved to the Massachusetts Institute of Technology (MIT, EEUU) under the supervision of Prof. C.A. Ross for a 2-years postdoctoral MEC/FULBRIGHT fellowship. In June 2009, I joined (Juan de la Cierva contract) the Universidad del País Vasco (UPV/EHU, Spain), under the supervision of Prof. F. Castaño for the set up and improvement of a laboratory for the fabrication and characterization of magnetic nanostructures. During this stage, I performed several short stays at Institut Laue-Langevin (ILL, France) as the research leader for studying the magnetic behaviour of ferromagnetic nanostructures using Polarized Neutron Reflectivity measurements. Since April 2013, I am working at IFIMUP-IN, as an independent researcher though a postdoctoral fellowship (SFRH/BPD/89808/2012) and a researcher contract (IF/01191/2013) funded by Fundação para a Ciência e a Tecnologia (FCT, Portugal), on understanding the ultrafast dynamical behavior of magnetic and magnetoplasmonic nanostructures. In summary, I have performed several mid/long research stays at 6 national and international research institutions such as ICMM-CSIC (Spain), Max Planck Institute of Microstructure Physics (Germany), MIT (USA), UPV/EHU (Spain), IFIMUP-IN (Portugal) and UNICAMP (Brazil). As well as several short research stays at KFKI-Research Institute for Particle and Nuclear Physics (Hungary), ESRF (France) and ILL (France).
I have an active participation in 17 projects funded by different organisms and I was/am the project leader at Porto University of 4: 2 European projects ?Coupling effects in magnetic patterned nanostructures? and ?Novel magnetic nanostructures for medical applications?, and 2 Portuguese projects ?Dynamics in nanostructured magnetoplasmonic materials: Generation and Control? and ?New low-cost approach for solar-cells based on magnetoplasmonic nanostructures ?. I co-supervised 1 PhD student and nowadays, I am the main co-supervisor of 1 PhD student. I am co-director of the Unit of ultrafast spectroscopy of spin dynamics included in the Portuguese Network of Extreme Conditions Laboratories.
My scientific work has been presented in 69 International conferences with 44 oral talks (14 invited talks). I published 2 book chapters and

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49 scientific papers (+2 submitted papers) in various peer-reviewed international journals such as Adv. Funct. Mater., Adv. Mater., Adv. Mater. Interfaces, Phys. Rev. Lett., Nano Research, Scientific Reports, Phys. Rev. B, New J. Phys., Appl. Phys. Lett., . My works have been cited more than 1000 times (without self-citations) and my h-factor is 20.

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Turno de acceso general

Nombre: JARDIEL RIVAS, TERESA
Referencia: RYC-2017-22719
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: jardiel@icv.csic.es

Título:

Innovative and sustainable processing of functional ceramics with nanoscale morphological control

Resumen de la Memoria:

My scientific career begins at Instituto de Ceramica y Vidrio (ICV-CSIC) where I completed my PhD degree with a thesis focused on lead-free piezoelectrics for high temperature applications. Soon I got familiar with the design and characterization of advanced microstructures produced through solid state processing methods and wet chemistry routes. Then I ran a two-year post-doc at the Universidad Carlos III de Madrid (UC3M) and the Institute of Materials Jean Rouxel (CNRS) of Nantes, France, expanding my research scope to the field of mixed conductors and the preparation of complex architectures through innovative shaping methods. Coming back to ICV I started to work on multiferroic materials and semiconductor photocatalysts, developing alternative synthesis methods for producing elaborated (micro)nanostructures specifically designed to obtain not just an improved response but also a highly integrating material.

The most relevant and innovative scientific developments along my scientific career can be summarized from two main points of view: innovative processes for the enhancement of the materials performance and better understanding of the physical and chemical phenomena involved during the fabrication of functional ceramics. On this basis, I currently gather a long experience on the synthesis and further processing of electroceramic materials and devices with improved functional properties. Also in the frame of different projects and actuations, I have acquired a deep knowledge on the interphase phenomena related to microstructure development and the attainment of functional response in different ceramic systems: ferroelectrics, piezoelectrics, conductors, semiconductors, multiferroics, catalysts, luminescent materials, etc. Obviously this entails the formulation of new optimized compositions and/or the development of innovative processing strategies, both being the elementary pillars defining the research work that I have carried out along my career. More specifically, the synthesis of materials from green chemistry and colloidal processing routes, the implementation of energy-saving bottom-up approaches and surface functionalization strategies, the design of devices with specific geometries and volume relationships (for a compliant integration into the final arrangement of the application) and, ultimately, a growing ability to shape, deposit and organize matter at the microscopic, mesoscopic and nanoscopic levels, are among the competences that I manage today to access the preparation of complex architectures, integrated configurations and functional phases with scientific and industrial relevance.

A simplified summary of my research lines can be displayed as follows:

Main research area:
- Synthesis and processing of functional ceramics

Other research lines:
- Synthesis of nanostructured materials under sustainable conditions.
- Microstructure engineering.
- Formation of metastable phases and range of solid solution.
- Processing of different geometries aimed to improve materials integration.
- Structural and microstructural characterization.
- Analyses of reaction mechanisms.
- Characterization of the electrical response and microstructure-properties correlation.

Resumen del Currículum Vitae:

The most relevant and innovative achievements along my scientific career can be summarized from two main perspectives: innovative processes for the enhancement of materials performance and better understanding of the physical and chemical phenomena involved during the fabrication of functional ceramics. This eventually entails a multidisciplinary research and covers a wide spectrum of competences that I manage today to attest the preparation of advanced assemblies and configurations with functional phases of scientific and industrial interest. The different publications in the top journals of materials science, contributions to scientific conferences and participation in research projects (competitive and with private companies), support this fact:
Up to date I have published 52 articles in high quality international journals, receiving more than 645 cites and yielding an H quotation factor of 14. I have taken part in more than 95 contributions to national and international conferences, this including 2 presentations as Key Note lectures and 7 more as Invited Talks. Similarly, I have been involved in the organization of 9 scientific conferences, 4 of them of

international scope. I have participated in 28 research projects, being part of two European actions: the CLEANSKY project and the 525 COST Action. Up to 9 of those projects correspond to contracts of special interest with the industry, where I mostly collaborate supervising the introduction of improved products and processing technologies into the market. As a result of the technological innovations developed during one of these collaborations I am co-author of 1 International Patent, currently licensed by the Spanish company Roca Sanitarios S.A. Also, I am involved in a scale-up process for the massive production of TiO2-based photocatalysts with the Spanish company INAEL Electrical Systems S.A. At present I am PI of one project of the Spanish National Programme for Research Aimed at the Challenges of Society; devoted to the synthesis of oxide semiconductors with nanoscale morphological control, it is granted with ca. 231k budget which I am using to start devising my own research line. Concerning my commitment with scientific training, I have tutored the work of 7 B.Sc. students and supervised 2 Ph.D. Thesis. In addition to these tangible achievements, my scientific CV also includes several stays at research institutions of renowned prestige in the area of materials science and engineering, namely the Jozef Stefan Institute of Ljubljana in Slovenia, the Jean Rouxel Institute of Materials of Nantes (CNRS) in France and the Universidad Carlos III de Madrid. Currently I am Associated Editor of the SCI journal Boletín de la Sociedad Española de Cerámica y Vidrio (Elsevier). I have been evaluator of scientific/technological projects (Government of Argentina) and I regularly collaborate as reviewer for different journals in several categories of Materials Science. Finally, all along my career I have displayed an active role as teacher, being Assistant Professor of a Master Degree Course at Universidad Carlos III de Madrid where I train PhD students on the synthesis and processing of advanced functional ceramics.