UNIVERSITAT JAUME I

BIENNIAL REPORT 2020- 2021

# RESEARCH INSTITUTE OF ADVANCED MATERIALS

Understanding and creating materials for a better future

inam Institute of Advanced Materials UJI Castelló

# CONTENTS

# MESSAGE FROM THE DIRECTOR

The Research Institute of Advanced Materials at the Universitat Jaume I (Institute of Advanced Materials, INAM, www.inam.uji.es) is a research centre for interdisciplinary science and technology, working in the fields of physics, chemistry, and related fields applied to advanced materials. INAM was created by the Government of the Autonomous Community of Valencia in April 2015. Our vision is: *to achieve a world class research centre for the understanding and creation of materials, bringing scientific insight and producing advanced applications for a better future.*

In order to attain this goal, we work towards a physical and chemical understanding of the properties of advanced materials and their workings, from molecules and interfaces to bulk compounds, connecting matter and light, to create new knowledge that bridges the gap between materials and devices. The fundamental and applied research conducted at INAM is oriented towards the frontier of knowledge with a global impact. The research teams at INAM aim to understand and unravel basic processes, the transformation of matter for useful purposes, and the physical and chemical interactions of molecules and materials. We pave the way for new functional materials that generate applications in clean energy supply and storage, lighting, and the creation of chemicals of high added value.

The two-year period of 2020-2021 was a time for the genesis of ideas, procedures, and the consolidation of a new project by a group of ambitious researchers that aim to establish a wider institutional framework. The combination of scientific excellence and new impulses for practical application has created a shared project, and growth in terms of projects and diversity of research areas is already apparent. The team has been expanded with the inclusion of several groups in the area of biomaterials and biosciences with materials applications: Bioinspired Supramolecular Chemistry and Materials; Neurobiotechnology; and Computational Biochemistry. Our efforts in terms of links to industries and the development of applied ideas have started to bear fruit, with many joint exploratory projects and patents. We believe we are on the right path towards a community dedicated to world-class science and knowledge, and capable of having a significant impact in much-needed solutions to social problems.

At the same time, we have gone through challenging times that have modified the focus of our research. The pandemic has highlighted the fragility of our socioeconomic system, revealed many weaknesses and established new priorities. We have become very aware of major and previously largely overlooked threats to our social organisation, at both local and global levels. An energy revolution is set to transform the way our world is powered. Dramatic changes are taking place in the way urban life, health care, professional communication and education are being organised and implemented because of the pandemic. Scientific knowledge has emerged as one of society's most valuable resources, and science has provided unique solutions for overcoming very challenging problems. Over the years, at INAM we have attained internationally recognised high levels of expertise in a range of key areas. Our society is now facing the urgent need to meet global challenges. However, only those possessing a consolidated research track in complementary disciplines are able to turn research into solutions to highly applied specific problems.

This applies to INAM and our strategic plan to guide our research and resources in the coming years. In response to opportunities arising in a changing environment, INAM's research must be extended to a diversity and plurality of areas that broadens the team's current scope and focus, opening up new directions for work on challenging projects that require complementary skills. We have identified the following priority areas where our combined skills and infrastructures could be extremely effective for the application of advanced materials science and technology to tackle such a challenging and global problem:

- Responding to the climate change emergency and the decarbonisation of energy.
- Creating a sustainable and clean environment.
- Improving the health and safety of citizens.
- Creating a more efficient economic system with high quality jobs in the industries of the future.
- Improving education in a transforming environment.

INAM will take responsibility for the transformation of values by a robust contribution to clean and safe world, and by the spread of education. Based on these perspectives, we present an outline of the main achievements and results at INAM for the period 2020-2021.

**Juan Bisquert**
*Director*

# THE STRATEGIC PLAN AND RESEARCH WORK

INAM has produced a strategic plan for 2020-2023 that combines three major lines, which are in turn divided into several specific lines:

INAM has produced a strategic plan for 2020-2023 that combines three major lines, which are in turn divided into several specific lines:

## 1. Chemistry to transform society (new chemical routes)

1.1. Fundamental reactions and catalysis
1.2. Decontamination
1.3 Added value products

## 2. Energy conversion and management (chemistry of materials and physical processes)

2.1. Energy production and conversion
2.2. Energy management and use

## 3. Adapting biological materials for functional applications

3.1. Modifying and applying biological matter for sustainability, health and energy
3.2. Combining biological materials with organic and inorganic matter for functional applications

The Institute's research areas for accomplishing our strategic plan have been identified based on our robust and successful research tradition, and considering the main general and regional European, Spanish and Valencian research and scientific priorities. These research topics can be divided into Major and Transversal topics:
Major Scientific Research Topics (RT)

- RT1: Energy storage, catalytic materials and chemical production of added value products
- RT2: Halide Perovskites and 2D materials
- RT3: Luminescent Advanced Materials
- RT4: Adapting biological materials for functional applications

Transversal Research Topics (TRT)

- TRT1: Advances in Theory
- TRT2: Upscaling and Engineering
- TRT3: Advanced Materials for Additive Manufacturing

## 2.1. Major Scientific Research Topics

- RT1: Energy storage, catalytic materials and chemical production of added value products. The efficient storage of renewable electricity in chemical bonds is one of the most promising strategies for providing sustainable energy vectors and chemical feedstock on a global scale. Electricity generated from renewable resources can also be applied to the electrocatalytic synthesis of chemical compounds with high added value. The goals of this RT include:
  - Photo- and electrochemical production of solar fuels.
  - CO2 reduction.
  - Biomass conversion to added value chemicals.
  - Waste valorisation.
  - Design of catalysts for chemical transformations.

- RT 2: Halide Perovskites and 2D materials. Halide perovskites and 2D materials have emerged as promising materials for a wide range of applications. INAM has been involved in the research in this area since this field emerged in 2012. The halide perovskite field is now consolidated, and new challenges have to be addressed in order to develop a new generation 2.0 of perovskite materials and devices. The goals of this RT include:
  - Addressing the traditional Achilles heels of this technology with new strategies,
  - Characterising and understanding halide perovskite-based devices for optoelectronic applications.
  - Developing halide perovskite-based devices for novel applications: photocatalysis.
  - Developing hybrid materials based on halide perovskites and quantum dots and/or organic systems.
  - Photocatalytic applications of halide perovskites (connected to RT1).
  - Beyond photovoltaics: using halide perovskites as sensing material in X-ray detectors.
  - 2D halide perovskites and expansion to surface science for 2D materials.

- RT 3: Luminescent Advanced Materials. Luminescent materials are at the core of every technology which uses light, such as solar cells, solar fuels, lighting and displays, photocatalysis and photoelectrochemistry. The processability of the emitters is of great interest for current applications of light-responsive technologies. INAM is a pioneer in the synthesis of different luminescent materials, including molecular emitters, lanthanide-doped materials and quantum dots (QD). The goals of this RT include:
  - Synthesising organic and organometallic species with luminescent properties.
  - Nanostructuring and sensitisation of lanthanide-doped nanocrystals with unique optical properties to enhance photon conversion efficiency, and their application in light-triggered processes.
  - Exploring the potentiality of hybrid halide perovskite-based QD, and their combination with colloidal QDs for the development of LEDs, light amplifiers and lasers.

- RT 4: Adapting biological materials for functional applications. Combining biological matter with organic and inorganic materials can provide a range of fundamental knowledge and significant applications that cannot otherwise be achieved. The design of novel biomaterials, bioactive molecules and compounds, and the formulation and synthesis of functional polymers with a defined action are important tools for the development of new systems, not only for medical purposes but also for smart catalytic applications. The goals of this RT include:
  - Developing imaging techniques with better resolution, higher sensitivity and contrast, more accessibility and affordability.
  - Developing sensing technologies through the identification of new markers of disease, rapid diagnoses and more frequent or continuous monitoring, in the hospital, the clinic or ideally in the home.
  - Developing low power circuits for data processing and wireless transmission, and novel real-time signal processing.
  - Developing biomaterials for tissue replacement.
  - Designing biocatalysts based on enzymes, for different catalytic applications, including plastic degradation, asymmetric synthesis, etc.
  - Applying engineering to the analysis and investigation of biological systems and to the design and construction of new synthetic biological systems.
  - Developing techniques to understand, repair, replace, enhance and otherwise exploit the properties of neural systems, and create novel neural interfaces.

## 2.2. Transversal Research Topics

INAM is firmly committed to cooperative research consisting of Transversal Research Topics (TRT). Each TRT includes different research areas, and provide support for our Specific Research Topics explained above.

- TRT 1: Advances in Theory. Theory assessments of fundamental material properties and optical/electronic properties and carrier transport can provide insights into device performance. We aim to incorporate skills in theoretical physical-chemical modelling (ab initio calculations, Montecarlo, DFT, etc.), transport and device understanding (drift-diffusion, interfacial phenomena, fundamental understanding of photoelectrocatalysis), advanced structural characterisation (SEM, TEM, EDX, synchrotron) and energetic characterisation (XPS, UPS) to complete the toolbox of techniques needed in the development of new material properties and applications.

- TRT 2: Upscaling and Engineering. We aim to incorporate skills in the areas of applied research, material and device engineering that can handle problems related to the upscaling of the fabrication of materials and devices. Transitioning to highly applied research is covered in this transversal field as a priority for all researchers at INAM. This priority will initially involve the technology transfer programme explained below, but it also affects areas of fundamental research that can provide applied outcomes. These new abilities will also open the door to cooperation in highly competitive applied research projects which start at higher TRLs (TRL 5 and above) than those that take place at the Institute, and will also help to produce technological and exploitable patents, which is currently a weak point.

- TRT 3: Advanced Materials for Additive Manufacturing. Additive manufacturing (AM), commonly known as 3D-printing (3DP), builds a three-dimensional object from a computer-aided design (CAD) model, usually by successively adding material layer by layer. These technologies are crucial for the digitalisation of industrial production, and are expected to play a key role in industry 4.0. This TRT will primarily focus on the development of advanced materials formulated on designer polymeric materials, and especially formulated for each AM technique employed. The preferred techniques will be inkjet, stereolithography (SLA), digital light processing (DLP) and selective laser sintering (SLS). This TRT is highly collaborative and transversal to our Specific Research Topics.


# HUMAN RESOURCES AND GOVERNANCE

The scientific and technological activities at INAM are organised by separate Research Groups (RG), each of which is headed by one or two experienced group leaders (Principal Investigator, PI) with recognised scientific careers with a major international impact. INAM has grown from three Research Groups (RG) when it was established to the current number of ten RG. This increase has been possible thanks to the combination of its leadership and ability to gain competitive grants (e.g. the ERC consolidator grant); the incorporation of tenure-track PI (the CIDEGENT grant) and the merger of RGs that actively collaborated with INAM and have enhanced the "Adapting biological materials for functional applications" research line. The current RG are:

- RG1. Energy and Advanced Materials
- RG2. Organometallic Chemistry and Homogeneous Catalysis
- RG3. Photoelectrochemistry for sustainable fuel production and chemical synthesis
- RG4. Advanced semiconductors
- RG5. Multifunctional Materials
- RG6. Materials for Advanced Sustainable Production
- RG7. Bioinspired Supramolecular Chemistry and Materials
- RG8. Neurobiotechnology
- RG9. Computational Biochemistry
- RG10. Hybrid catalytic materials

The distribution of Human Resources in the various RG is set out in the following table:

| RG | PI | STAFF | POSTDOC | PREDOC-TORAL | ADMIN/ TECHNICAL STAFF | TOTAL |
|---|---|---|---|---|---|---|
| 1 | Prof. Juan Bisquert<br>Prof. Germà Garcia-Belmonte | 3 | 1 | 7 | | 11 |
| 2 | Prof. Eduardo Peris | 2 | 2 | 3 | | 7 |
| 3 | Prof. Francisco Fabregat-Santiago<br>Prof. Sixto Giménez | 3 | 2 | 5 | | 10 |
| 4 | Prof. Iván Mora-Seró | 2 | 6 | 8 | | 16 |
| 5 | Dr Beatriz Julián | 1 | | | | 1 |
| 6 | Dr Víctor Sans | | 1 | 2 | 1 | 4 |
| 7 | Prof. Beatriu Escuder | 1 | 1 | 2 | | 4 |
| 8 | Dr Ana Mª Sánchez | 1 | | 1 | | 2 |
| 9 | Prof. Vicente Moliner | 4 | 1 | 4 | | 9 |
| 10 | Prof. Jose Mata | 1 | 1 | 1 | | 3 |
| | TOTAL | 18 | 15 | 32 | 1 | 66 |
| | Administration | | | | 2 | 2 |
| | Lab technicians | | | | 2 | 2 |
| | Innovation technicians | | | | 3 | 3 |
| | TOTAL | 18 | 32 | 24 | 8 | 73 |

### 3.1. Description of new Research Groups at INAM

RG 7 Bioinspired Supramolecular Chemistry and Materials

The group uses biology as an inspiration in the design of functional supramolecular materials, The team has extensive expertise in the design of peptide-based self-assembled fibrillar networks and supramolecular gels. The group's research programme is currently focused on developing peptide-based soft materials for applications in biomimetic supramolecular catalysis, drug delivery and as biomaterials for regenerative medicine. This group is also involved in a close collaboration with an SME in the pharmaceutical field through a Retos-Colaboración Grant, working on the development of peptide soft materials for topical application, and an industrial research project on the development of new nanocarriers with the company Polypeptide Therapeutic Solutions (https://pts-polypeptides.com/). In addition, the PI is co-supervisor of an Industrial Doctorate funded by the Spanish Ministry of Science and Innovation.

RG 8 Neurobiotechnology

The group aims to untangle the pathophysiology of diseases of the nervous system, using a wide range of strategies ranging from biotechnological tools to natural product analogues. The group focuses its efforts on revealing new targets for treating these disorders, developing new intervention strategies with improved therapeutic potential. The group's emerging lines of research include: prediction of disease risk, based on mathematical algorithms and artificial intelligence, combining genetic polymorphisms and environmental factors; 3D printing of organs to study antitumoural capabilities of plasmids developed in-house, and blood-brain barrier 3D printing to study nervous system physiopathology; and the application of biomaterials to improve gene transfer and diagnosis.

RG 9 Computational Biochemistry

he BioComp group works on the computational description of catalysis phenomena in biological systems, and mostly enzyme catalysed processes. Theories, methods and techniques of theoretical and computational chemistry are developed, implemented and used to that end. Computational algorithms and protocols based on hybrid QM/MM potentials are created, and this new knowledge is exploited in the design of new materials with properties for use in biomedicine and biotechnology. In particular, these applications are focused on elucidating enzyme reaction mechanisms including fundamental new quantum and dynamical perspectives to design new pharmacological agents to inhibit enzyme activity, and new catalysts mimicking the catalytic efficiency and features of natural enzymes.

RG 10 Hybrid catalytic materials

The group focuses on the development of advanced hybrid materials for energy conversion and storage based on catalytic transformations. The hybrid materials are developed from well-defined organometallic complexes. The approach for these applications is divided into three different research lines. These are: i) Organometallic chemistry: design, characterisation and properties of new catalysts; ii) Catalytic applications in processes related to hydrogenation and dehydrogenation; and iii) New materials: study of the properties and applications of organometallic compounds and metal nanoparticles supported in graphene derivatives for energy conversion and storage. The group is also involved in industrial projects related to hydrogen storage, depolymerisation processes and catalyst development in connection with a regional funding programme (AVI).

### 3.2. Governance

INAM is governed by its Executive Council, Management Commission, Executive Board and Management Team, with scientific advice from the Scientific Advisory Board.

- The Executive Council (EC) is the senior governing body, and is chaired by the Rector of UJI. The EC approves INAM's Internal Regulation Document, designs and provides working areas for the Institute, and designates the Management Team elected by the Executive Board.

- The Management Commission (MC) is composed of representative Vice-rectors of the EC, the Management Team of INAM, and a representative of the Government of the Valencian Community. The MC carries out reviews of INAM, analysing scientific and technological results, attracting external resources, budgetary developments and needs, space, staff, and other specific issues.
- 
- The Executive Board (EB) is the highest representative and governing body within INAM. It includes all its members, according to membership rules set out in the Internal Regulation Document. Its tasks cover a wide spectrum, ensuring a shared decision-making process at all level of the unit's activities.
- 
- The Management Team (MT) represents and manages INAM, administers the EB's decisions with scientific support from the Scientific Advisory Board (SAB), seeking scientific quality and ensuring that all the members follow the IRD's rules. It is elected by the EB, and is composed of a Director, Deputy Director and Secretary. The MT also takes ordinary decisions, advised by the small Permanent Board, consisting of the MT and PIs elected by the EB. The Director represents the Institute, directs the ordinary management and executes the agreements of the collegiate bodies so that its purposes are fulfilled faithfully. In 2020, a new MT with a strong female representation included the following members:
  - Director: Juan Bisquert
  - Deputy Director: Macarena Poyatos
  - Secretary: Elena Mas

The directions of research at INAM are established by four-year plans that set out the purpose and direction of research objectives for the period. The Institute's activities are evaluated from the perspective of the four-year plan by the Scientific Advisory Board of the INAM, which is the body providing oversight and advice for the Institute's scientific activities. The Scientific Advisory Board (SAB) oversees the quality of science and structure at INAM, including its long-term objectives, the merits of each RG, the balance of knowledge and skills, as well as leadership and communication effectiveness. The members of the Scientific Advisory Board are distinguished experts in the Institute's research domains. Its current composition is as follows:

- Prof. Miquel A. Pericàs, Founding Director of the Institute of Chemical Research of Catalonia, Tarragona, Spain
- Prof. James Durrant, Professor of Photochemistry, Imperial College, London, UK
- Prof. Thuc-Quyen Nguyen, Professor of Chemistry and Biochemistry, University of California, Santa Barbara, CA, USA
- Prof. Luis A. Oro, Instituto de Síntesis Química y Catálisis Homogénea, Dept. of Inorganic Chemistry, University of Zaragoza-CSIC, Zaragoza, Spain.
- Prof. Elisabeth von Hauff, Department of Physics and Astronomy, Vrije Universitat Amsterdam, The Netherlands.
- Prof. Laura Lechuga Gómez, Catalan Institute of Nanoscience and Nanotechnology (ICN2), Barcelona.

# OPINION


As stated in INAM's mission, the institute is committed to creating new materials with advanced applications for a better future. The research groups involved are focused on the same objectives but use very different approaches, thereby creating a highly diverse and interdisciplinary environment. This is exactly what I find most attractive about the institute - we have different visions and approaches, and sometimes we even use different languages, but we have the common objective of creating new materials with unexpected and promising applications in mind. Something I find very valuable is that the working atmosphere is always collaborative and pleasant. In particular, the Institute has provided my group with the opportunity to use sophisticated equipment, enabling us to study interesting features of our complexes that we would otherwise be unable to see. Furthermore, I have had the privilege to get to know the institute from the inside since my appointment as Deputy Director. During these intense months, we have worked hard to promote the recruitment of women and young researchers, and to involve the members of the institute in outreach activities.

# GENDER BALANCE

We believe that a plan for gender equality in research is essential to avoid gender inequality. In 2020-2021, our guiding principles allowed us to increase the female presence in our institution. As a result, our numbers in terms of gender equality improved considerably. For example, the number of women has increased by 100% increase in in permanent staff, 200% in postdoctoral researchers and 25% in predoctoral students. In 2020-2021, women made up nearly 40% of the staff in our institution. We are aware that we must continue working to break the glass ceiling and pave the way for women in science.

# OPINIONS

After almost 20 years of fundamental research in the field of Supramolecular Chemistry and Materials, recently joining INAM has given a new perspective to my career. What I have found most appealing since joining the Institute is its strong commitment to interdisciplinarity, internationalisation and innovation in research. The Institute provides a unique atmosphere that combines fundamental research with truly industrially-oriented programmes. I have already had the opportunity to participate in the UCIE-INAM innovation unit, which is a government-funded programme that aims to stimulate the transfer of knowledge to region's industry. Within this framework, I am currently converting my fundamental know-how of soft matter into application-based designs that may appeal to companies working on drug delivery, cosmetics and home care products, among other areas. I am also very interested in collaborative projects that are at the interface of chemistry, physics and biomaterials science, and the INAM is the ideal forum for this, with a unique combination of experienced as well as talented young scientists working on chemistry and physics for energy and catalysis.

**PROF. BEATRIU ESCUDER**
*(Principal Investigator of the bioinspired supramolecular chemistry and materials research group)*

The overarching goal in my career is to become a world-class scientist in the field of sustainable chemistry, with a focus on providing novel solutions to the transformation of greenhouse gases to tackle the problems of climate change. Within this context, INAM offers a unique environment, vision, cutting-edge technological equipment, and opportunities for collaboration completely aligned with my objectives. In addition, I selected the Institute for my MSCA-IF fellowship taking into account that INAM has a strategic plan for attracting, mentoring and developing early career researchers, with a special focus on supporting female scientists in their career progression. Furthermore, INAM fosters world leading scientists, including extensively cited grant holders (Humboldt and ERC), who are inspiring role models for career development. Finally, INAM has a multicultural atmosphere with researchers from various nationalities that create a unique, enjoyable and collaborative environment.

**DR MARCILEIA ZANATTA**
*(Research Scientist (MSCA-IF Fellow))*



**DR ANA MARÍA SÁNCHEZ-PÉREZ**
*(Principal Investigator of the Neurobiotechnology Research Group)*

My decision to join the INAM was driven by a common interest in opening up new and ambitious lines of research that require solid interdisciplinary collaboration between biology, chemistry and physics. This is true of plastic biodegradation; we aim to improve plastic degradation by combining chemical, electrochemical and enzymatic actions, and to design and test novel enzymes with improved catalytic capacity. One of INAM´s main objectives is to transfer innovation to industry, which is how the new knowledge can help society. Since I joined the institute, I have had the opportunity to interact directly with Valencia's industries, to understand their perspective on plastic waste, plastic recycling and plastic degradation and added value products. This interaction has been facilitated by INAM's infrastructure, and it is crucial for orientating research towards effective solutions. In the history of science, major breakthroughs have often been due to the interaction between apparently distant disciplines, I believe that INAM provides the interface for such interactions.

**DR SOFIA MASI**
*(Research Scientist (Juan de La Cierva incorporation Fellow))*

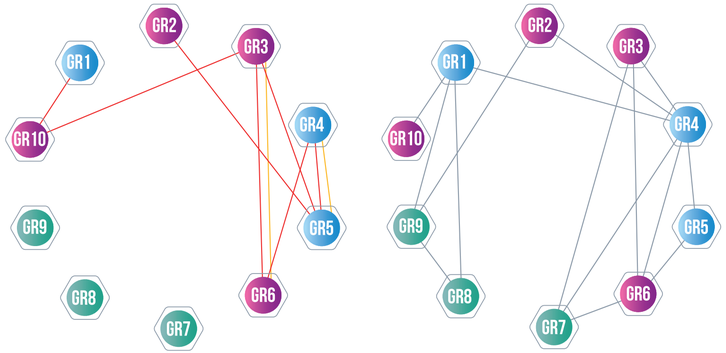
INAM is an extraordinary platform for content and relationships in Spain. I did not come to INAM for a job; after a degree in Chemistry and my PhD in Bio-Molecular Nanotechnologies in Italy I found a place for my talent to flourish. I have the flexibility to follow different research lines related to the chemistry and physics of materials for energy, and even take on new challenges within the INAM's projects. At INAM I am building a career, and I have joined a family that is working together to propel the institute to excellence. High ethical standards, respect, accountability, integrity, service and scientific excellence are the hallmarks of this institute. INAM is a good place for training in research, teaching, and collaborating with experts in several sectors, while always balancing life and research. Within this framework, I am currently working on materials for photovoltaics, how to achieve the highest efficiencies with low cost and eco-friendly materials for saving energy. I am very interested in inter- and multi-disciplinary projects at the forefront of energy research, to boost the international networks of talented collaborators. Our research is also interesting for companies in the electronics and construction sectors, among many others, with which INAM has consolidated contacts. INAM is certainly an established, international and cutting-edge institution, in which knowledge, tools and support flourish to provide a successful career.


I'm Loles Merchan and I work at INAM as the person in charge of the administration. I had the opportunity to join INAM since its creation in April 2015. But I started working for a group of researchers back in July 2008. I was appointed to develop Consolider project financed by Mineco. I had previously worked at UJI but managed European projects with social purposes. When Juan Bisquert offered me to work managing scientific projects I thought that I shouldn't have many difficulties. Later I realised that I'd been quite daring to think that it would be easy. The position required to know how to do a little bit of everything, and be prepared to face all the new challenges, constant changes according to the needs of researchers. The group grew vertiginously. In 2015 the institute was created and since then new research groups have been incorporated. As a growing research institute with ambitious goals, INAM needs a committed administration and team to provide highly qualified support across key areas. I believe that the environment created in our institute will impact how they conduct their research now and in future. So it's important that we create meaningful opportunities for researchers to find their pathway.

I am Patricia Gracia and I have been working at INAM since June 2020. I am a technical industrial design engineer with a postgraduate degree in communication and marketing, both from the Universitat Jaume I. Previously, I had worked in a private company commissioning injection machinery for more than 6 years and I also did inkjet chromic design. Actually, my job at INAM is that of an innovation agent subsidized by AVI Generalitat Valenciana INAM needs a committed knowledge transfer and team to provide highly qualified support in key areas. Right now, I work closely with researchers to help them achieve their goals of being able to bring their research to the business fabric. Part of my job is to look for companies that are directly related to the research carried out at the institute, with our innovation and to be able to help research projects have adequate resources through contracts, agreements and grant applications.


# INTERACTION BETWEEN RESEARCH GROUPS

At INAM we aim for a truly interdisciplinary and cooperative research. The ten INAM Research Groups established strong synergies in 2020 and 2021 by means of collaborative grant applications and PhD co-supervision, among other activities. In addition, the informal exchanges of scientific knowledge between apparently unrelated topics are the seeds for future ground-breaking projects.



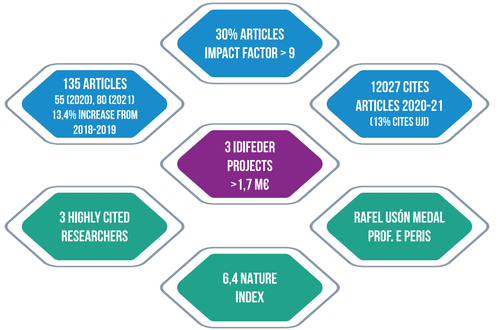

Funded grant

Phd co-supervision

Scientific collboration

# SUMMARY OF SCIENTIFIC RESULTS

The restrictions associated with the pandemic, including lockdowns, have had a significant impact on researchers, not only in terms of their mental and physical health, but also on their research work and scientific results. INAM's research activities were severely hampered, especially in 2020, and our scientific results were affected mainly as a result of the lockdowns and the subsequent measures. Nevertheless, we have adapted to the new situation, as clearly reflected in the results for 2020-2021.




| IMPACT FACTOR | No. PUBLICATIONS | | PERCENTAGE |
|---|---|---|---|
| | 2020 | 2021 | |
| >9 | 13 | 33 | 30 |
| [3-9] | 36 | 39 | 56 |
| <3 | 6 | 8 | 13 |
| TOTAL | 55 | 80 | |
| CITED | 760 | 486 | |

**6.1. Publications with highest impact factor**

Chemical Reviews, **2021**, 121, 14430–14484. Guerrero, A.; Bisquert, J.; Garcia-Belmonte, G. **Impedance Spectroscopy of Metal Halide Perovskite Solar Cells from the Perspective of Equivalent Circuits.**

ACS Energy Letters, **2021**, 6, 10, 3750–3752. Ma, D.; Mora-Seró, I.; Saliba, M.; Etgar, L. **Energy Spotlight Stabilization of Perovskite Solar Cells.**

Advanced Energy Materials, **2021**, 2102526. Almora, O. **Device Performance of Emerging Photovoltaic Materials (Version 2).**

Angewandte Chemie International Edition, **2021**, 60, 20003-20011. Ruíz-Zambrana, C.; Gutierrez-Blanco, A.; Gonell, S.; Poyatos, M.; Peris, E. **Redox-Switchable Cycloisomerization of Alkynoic Acids with Napthalenediimide-Derived N-Heterocyclic Carbene Complexes.**

Nature Electronics, **2021**, 4, 681–688. Deumel, S.; van Breemen, A.; Gelinck, G.; Peeters, B.; Maas, J.; Verbeek, R.; Shanmugam, S.; Akkerman, H.; Meulenkamp, E.; Huerdler, J.E.; Acharya, M.; García-Batlle, M.; Almora, O.; Guerrero, A.; Garcia-Belmonte, G.; Heiss, W.; Schmidt, O.; Tedde, S.F. **High-sensitivity high-resolution X-ray imaging with soft-sintered metal halide perovskites.**

ACS Energy Letters, **2021**, 6, 3511–3521. Salim, K.M. Muhamme; Masi, S.; Gualdrón-Reyes, A.F.; Sánchez, R.S.; Barea, E.M.; Krečmarová, M.; Sánchez-Royo, J.F.; Mora-Seró, I. **Boosting Long-Term Stability of Pure Formamidinium Perovskite Solar Cells by Ambient Air Additive Assisted Fabrication.**

Advanced Energy Materials, **2021**, 11, 2100022.Almora, O. **Quantifying the Absorption Onset in the Quantum Efficiency of Emerging Photovoltaic Devices.**

Angewandte Chemie International Edition, **2021**, 60, 15412-15417. Vicent, C.; Martínez-Agramunt, V.; Gandhi, V.; Larriba-Andaluz, C.; Gusev, D.G.; Peris, E. **Ion Mobility Mass Spectrometry Uncovers Guest-Induced Distortions in a Supramolecular Organometallic Metallosquare.**

ACS Energy Letters, **2021**, 6, 710–712. Yu, Y.; Mora-Seró, I.; Hicks, J.C. **Advances in Storage Batteries, Layered Hybrid Perovskites and Organic Photovoltaics, and Plasma Activated Ammonia Synthesis.**

Nature Communications, **2021**, 12, 231. Weilhard, A.; Argent, S.P.; Sans, V. **Efficient carbon dioxide hydrogenation to formic acid with buffering ionic liquids.**

Nature Energy, **2021**, 6, 54–62. Hernandez, E.Velilla; Jaramillo, F.; Mora-Seró, I. **High-Throughput analysis of ideality factor to evaluate outdoor performance of perovskite solar mini modules.**

ACS Energy Letters, **2021**, 6, 2248–2255. Bou, A.; Abolins, H.; Ashoka, A.; Cruanyes, H.; Guerrero, A.; Deschler, F.; Bisquert, J. **Extracting in Situ Charge Carrier Diffusion Parameters in Perovskite Solar Cells with Light Modulated Techniques.**

Nature Sustainability, **2020**, 4, 277-285. Vidal, R.; Alberola-Borràs, J.A.; Habisreutinger, S.N.; Gimeno-Molina, J.L.; Moore, D.T.; Schloemer, T.H.; Mora-Seró, I.; Berry, J.J.; Luther, J.M. **Assessing health and environmental impacts of solvents for producing perovskite solar cells.**

Advanced Energy Materials, **2020**, 2002422, 2-9. Sánchez-Godoy, H.; Emmanuel, E.; Ansisar, E.; Gualdrón-Reyes, A.F.; Khan, A.; Hossain; Agouram, S.; Barea, E.M.; Rodriguez, R.A.; Zarazua, I.; Ortiz, P.; Cortés, M.T.; Muñoz-Sanjosé, V.; Moreels, I.; Masi, S.; Mora-Seró, I. **Preferred Growth Direction by PbS Nanoplatelets Preserves Perovskite Infrared Light Harvesting for Stable, Reproducible, and Efficient Solar Cells.**

Angewandte Chemie International Edition, **2020**, 59, 14331-14335. Martin, C.; Kastner, K.; Cameron, J.M.; Hampson, E.; Fernandes, J.A.; Gibson, E.K.; Walsh, D.A.; Sans, V.; Newton, G.N. **Redox-active hybrid polyoxometalate-stabilised Au nanoparticles.**

Accounts of Chemical Research, **2020**, 53, 1401–1413. Ibáñez, S.; Poyatos, M.; Peris, E. **N-Heterocyclic Carbenes: A Door Open to Supramolecular Organometallic Chemistry.**

Advanced Energy Materials, **2020**, 2001774. Mora-Seró, I. **Current Challenges in the Development of Quantum Dot Sensitized Solar Cells.**

Nano Energy, **2020**, 75, 104982. Almora, O.; Zhao, Y.; Du, X.; Heumueller, T.; Matt, G.J.; Garcia-Belmonte, G.; Brabec, C.J. **Light intensity modulated impedance spectroscopy (LIMIS) in all-solid-state solar cells at open-circuit.**

ACS Energy Letters, **2020**, 5, 1974-1985. Masi, S.; Gualdrón-Reyes, A.F.; Mora-Seró, I. **Stabilization of Black Perovskite Phase in FAPbI3 and CsPbI3.**

ACS Energy Letters, **2020**, 5, 1013-1021. Rodríguez-Romero, J.; Sanchez-Diaz, J.; Echeverría-Arrondo, C.; Masi, S.; Esparza, D.; Barea, E.M.; Mora-Seró, I. **Widening the 2D/3D Perovskite Family for Efficient and Thermal-Resistant Solar Cells by the Use of Secondary Ammonium Cations.**

Nature Energy, **2020**, Mora-Seró, I. **Turn defects into strengths.**

ACS Energy Letters, **2020**, 5, 1662-1664. Lu, J.; Ma, D.; Mora-Seró, I. **Energy Spotlight.**

Angewandte Chemie International Edition, **2020**, 59, 6860-6865. Ibáñez, S.; Peris, E. **Dimensional Matching versus Induced-Fit Distortions: Binding Affinities of Planar and Curved Polyaromatic Hydrocarbons with a Tetragold Metallorectangle.**

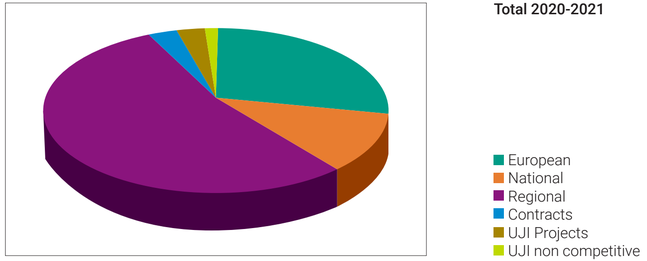
ACS Energy Letters, **2020**, 5, 418-427. Masi, S.; Echeverría-Arrondo, C.; Salim, K.M.; Muhamme, N.; Tuyen, T.; Mendez, P.F.; Lopez-Fraguas, E.; Macias-Pinilla, D.F.; Planelles, J.; Climente, J.I.; Mora-Seró, I. **Chemi-Structural Stabilization of Formamidinium Lead Iodide Perovskite by Using Embedded Quantum Dots.**

ACS Energy Letters, **2020**, 5, 187-191. Cardenas-Morcoso, D.; Bou, A.; Ravishankar, S.; Garcia-Tecedor, M.; Giménez, S.; Bisquert, J. **Intensity-Modulated Photocurrent Spectroscopy for Solar Energy Conversion Devices: What Does a Negative Value Mean?**

# FINANCIAL REPORT

## Distribution of funding by sources

The total funding obtained by INAM in 2020-2021 amounted to over 5.8 M€, which is an increase of almost 90% compared to the previous two-year period. These numbers clearly reflect INAM's ability to attract research funds. Our funding is extensively supported by European projects, which provide more than 1.6 M€, and regional projects with over 3.1 M€. We have obtained funding through projects undertaken by all the INAM RGs, especially for infrastructure (the Government of the Valencian Community). We have also secured funding from the Valencian Innovation Agency (AVI), to increase our work with industrial companies in the Valencian Community (500 k€ in 2020-2021). Cooperation with industry and advisory activities amounted to 150 k€ in 2020-2021.




| | 2020 M € | 2021 M € | Total |
|---|---|---|---|
| European | 0,87 | 0,82 | 1,69 |
| National | 0,28 | 0,32 | 0,60 |
| Regional | 1,39 | 1,72 | 3,11 |
| Industrial Contracts | 0,05 | 0,10 | 0,15 |
| UJI total | 0,12 | 0,15 | 0,27 |
| Total K € | 2,70 | 3,11 | 5,82 |

# INFRASTRUCTURE AND EQUIPMENT

INAM launched new shared laboratories in 2020 - 2021 for all members of the institute and which are open to the Scientific Community at UJI: the Photoelectrochemical Reactor Laboratory and Laboratories for functional coatings for technological applications. These laboratories have been created thanks to the IDIFEDER programme, an action co-financed by the European Union through the Operational Programme of the European Regional Development Fund (ERDF) of the Valencian Community (http://idifeder-inam.uji.es/).

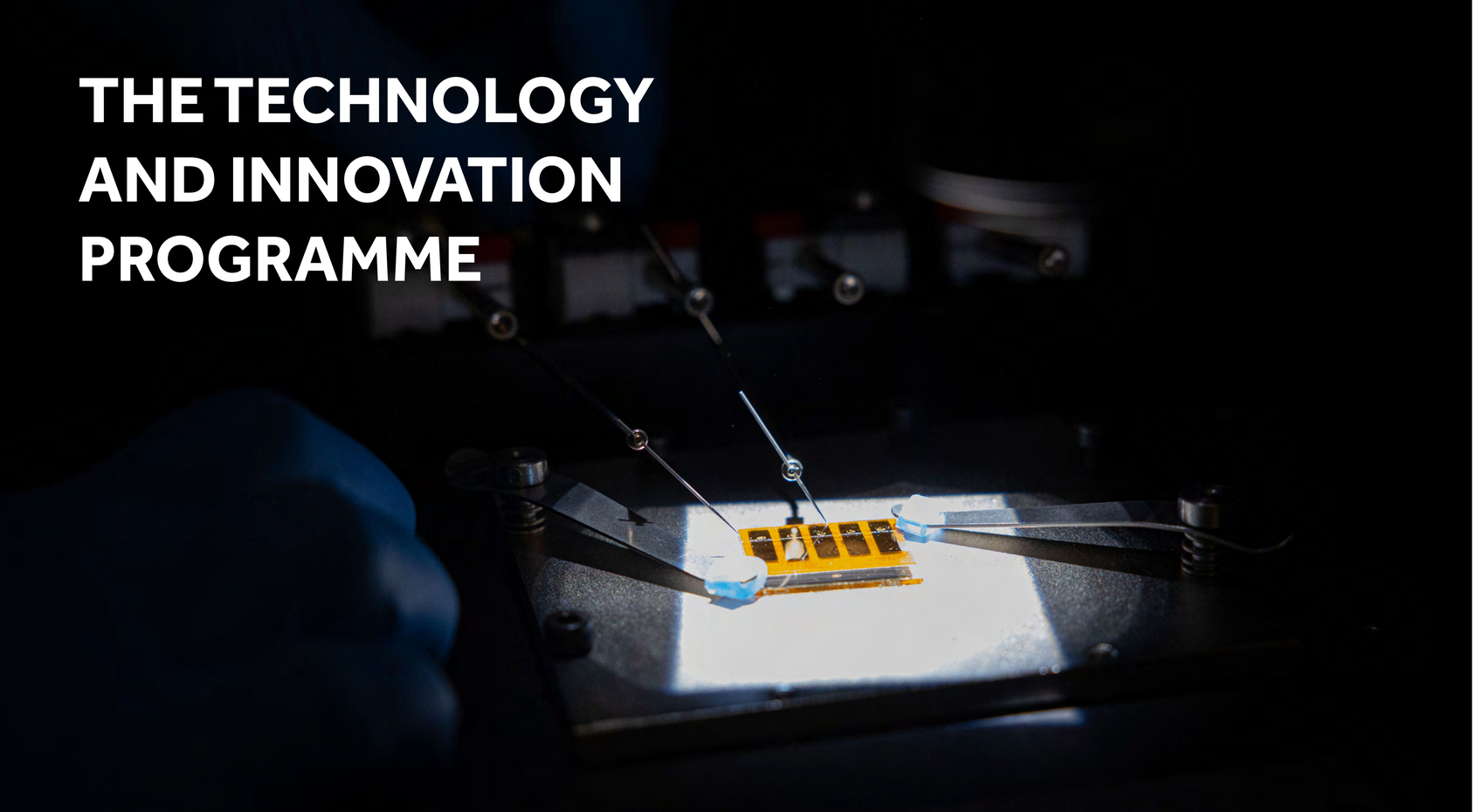
Photoelectrochemical Reactor Laboratory

This new research laboratory focuses on the development of (photo)electrocatalytic processes for the production of chemical compounds with high added value and waste recovery on a significant scale for carrying out tests prior to their industrial application. This initiative is an interdisciplinary line of research within the institute, involving the extensive experience of the various INAM research teams in the synthesis of materials, photoactivated processes, electrochemistry, chemical engineering and catalysis, and the use of renewable energies.

Laboratories for functional coatings for technological applications

These laboratories have been created with the University Institute of Ceramic Technology (IUTC). The laboratories specialise in the characterisation of inks and devices, for establishing the characterisation protocols of the inks and materials used in the deposit of thin layers using ink-jet techniques. The facilities also work on the preparation of thin films and devices using various ink printing techniques, "spin coating" evaporation and "sputter" for applications in membranes and electrodes for applications in sustainable technologies, generation and energy storage, research on optoelectronic materials and surfaces, and the development of antimicrobial materials for wound dressings.

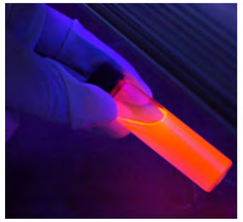
# THE TECHNOLOGY AND INNOVATION PROGRAMME



In 2019, we created the Unitat Científica d'Innovació Empresarial (UCIE-INAM), funded by the Valencian Innovation Agency (AVI). UCIE-INAM has been operating under the management of Prof. Juan Bisquert and Prof. Francisco Fabregat Santiago, with the involvement and firm commitment of all the INAM Research Groups.

UCIE-INAM has focused on exploring opportunities to transfer our technologies to local industry. Our work at UCIE-INAM in 2020-2021 was centred on the following lines:

- Funtional and electrocatalytic ceramics
- Development of polymeric materials and photoluminescent inks with high added value
- Energy storage
- Multifunctional antimicrobial and antiviral coatings
- Hydrogels for transdermal application of drugs
- Degradation of plastics and microplastics by enymatic methods




As a result of the work done at UCIE-INAM, many contacts with industry centred on our range of technologies have been developed, and several patents have been filed.

# SOCIOECONOMIC OUTREACH

Due to the pandemic, our outreach activities declined in 2020-2021 in comparison with the previous years. Nonetheless, INAM participated in several initiatives:

E-STEAM
Equality in Science, Technology, Engineering, Art and Mathematics

Beatriz Julián, Macarena Poyatos and Elena Mas-Marzá participated as mentors in the Erasmus+ E-STEAM Project to mentor Young female students.

Scientific Fair (2nd edition, Murcia) organized by University of Murcia, participation of Beatriz Julián and Sixto Giménez.

Participation of Germà Garcia-Belmonte with a talk about photovoltaics at Fundació Caixa Vinaròs, conferences "cicle ciènciaprop"


Participation of Ivan Mora in the section: "La Universidad Responde" at TV programme "La aventrura del Sabere¿Cómo conseguir un consumo sostenible de energía?».

EOES
European Olympiad of Experimental Science

Olimpiada Europea of Sicence.

Participation of Juan Bisquert in Foro de Economia Comarcal orgasnised by Levante-EMV and Apunt

Camilo Mesa, participated in Summer Camp at MonNatura Pyrenees organized by Fundació Catalunya La Pedrera

Participation of INAM researchers at Mednight



Beatriz Julián and Macarena Poyatos participated in Dia de la Dona I la Xiqueta en la Ciencia organised by UJI.


Participation of Ana Mª Sanchez in the section: "La Universidad Responde" at TV programme "La Aventura del Saber"


Women in Science INAM's videos

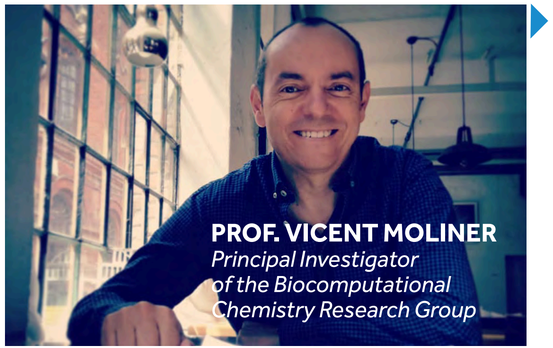
Exhibition: 'Ellas tienen la fórmula'. Organized by Eduardo Peris

# THE OPINIONS OF RESEARCHERS

After finishing my degree, and as someone looking forward to obtaining a PhD, finding an excellent and interdisciplinary place to blossom is crucial, and INAM fulfils those criteria. The high quality of its research, its facilities, and the number of international researchers that work together make it a unique place to learn from different perspectives, providing the opportunity to form part of an incredible network of international collaborators and publish in extensively cited journals. My interests to date are related to renewable energy and photoelectrocatalysis - areas in which INAM excels since its investigators (e.g. Juan Bisquert, Sixto Giménez and Fran Fabregat) have a huge impact on the scientific community, as confirmed by Stanford University in its latest ranking of most cited researchers. This incredible atmosphere at INAM gives me the opportunity to build a solid foundation and to make a difference in this world. biomaterials science, and the INAM is the ideal forum for this, with a unique combination of experienced as well as talented young scientists working on chemistry and physics for energy and catalysis.


My research background focused on the molecular level where the exact location of all atoms is precise. I then decided to move to the design of materials on a molecular level based on bottom-up approaches. Starting a new research line is a difficult task and requires a lot of effort, but joining INAM provided me with new ways of thinking. INAM is a multidisciplinary research institute that includes physicists and chemists. In my opinion, working at INAM is unique because you can address problems from completely different points of view. Since I joined INAM, I have begun collaborations with different research units working on electrodehydrogenation processes applied to organic transformations.

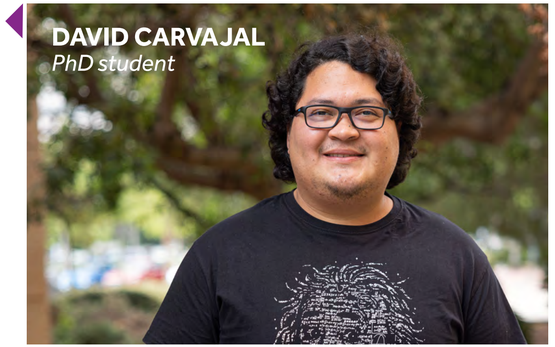



Our Biocomputational Chemistry (BioComp) group has recently joined the INAM, with a view to increasing our collaborations with other research areas, as well as with companies in the recycling and pharmaceuticals field. We have begun a collaboration with two groups at the INAM to develop new biocatalysts to degrade synthetic polymers such as PET. Our group will be responsible for the computational simulations to provide guides to synthesise new catalysts. In general terms, we are in contact with various groups at INAM to carry out ambitious multidisciplinary projects that otherwise would not be possible. Indeed, we have already presented two applications to two different calls of the Government of the Valencian Community (GVA).


After completing my master's thesis with a scholarship from INAM, I became interested in the field of research and continued with the project I was working on. Since recently joining INAM, my career has received a new perspective, giving me the opportunity to learn from other scientific disciplines. What attracted me to the Institute was its strong commitment to interdisciplinary scientific and technological research. It offers an environment based on teamwork, in which your research is oriented to industry and the problems we currently have, such as environmental pollution by different materials. I think it is a good place to begin my career as a researcher and acquire the necessary experience to be able to dedicate myself to the world of research.

Joining INAM is a great opportunity to increase my skills as a young researcher. This Institute is an excellent place for my PhD studies and developing my knowledge in the areas related with synthesis of new electrode materials and their applications in electrocatalysis. This research centre not only has the laboratory equipment necessary to do my research, it also has the people with the experience and motivation to innovate in many fields of chemistry, physics and material science.




After completing my master's degree in the field of Physical Chemistry and Biomaterials, joining INAM as a Grisolia researcher has given my career a new perspective. I have recently been working in the Bioinspired Supramolecular Chemistry and Materials group (BIOSUPRAMAT) as a PhD fellow since January 2021, under the supervision of Prof. Dr Beatriu Escuder, and this group works in collaboration with INAM. Our lab is interested in designing functional supramolecular materials for biomedical applications such as drug delivery and regenerative medicine. The Institute provides a unique atmosphere that combines fundamental research with industrially-oriented programmes and interdisciplinary concepts. Furthermore, INAM is an institute with a unique combination of experienced and highly motivated scientists working in different fields of science and innovation in research





Attending the celebratory paella to mark the founding of INAM was a privilege, and coming back nearly three years later for my first postdoctoral project has been a great experience. The motivation for scientific research among the group leaders and all the personnel in general is what makes the difference in obtaining results that are recognised worldwide. I have always been interested in the optoelectronic characterisation and modelling of semiconductor and energy technologies. INAM has not only provided a productive environment, but also a versatile multicultural and multidisciplinary perspective, fostering creativity and character development.


After pursuing my PhD in optical spectroscopic methods to study materials for energy conversion and storage at Imperial College London, I realised I needed to gain knowledge of electrochemical techniques to study those materials. Joining the Institute of Advanced Materials, a renowned institution that focuses on exploring and understanding the functioning of materials for different applications, became an obvious step in my academic career. I joined INAM in July 2020, in the middle of the Covid-19 pandemic, and discovered a fully supportive environment and a highly interdisciplinary institute with state-of-the-art laboratories to carry out my projects. Thanks to the support given by INAM and the different division leaders, I have been able to expand my academic curriculum as an early career researcher by leading and collaborating in various projects. I currently hold a postdoctoral fellowship position through the APOSTD grant from the Government of the Valencian Community, and focus my research on studying (photo)electrocatalysts for hydrogen evolution, CO2 reduction and high added value chemicals synthesis by electrochemical and optical techniques. From a more personal point of view, having moved to Castellon and being in such an enjoyable working environment has become one of the highlights in my career and life.

I have been pursuing my postdoctoral research at INAM for more than two years, in the Advanced Semiconductors group under the supervision of Prof. Iván Mora-Seró. INAM is my first foreign affiliation. My motivation for joining this Institute was to gain international recognition, work with high-profile researchers, and to be involved in inventive research output. INAM also provides both the academic and corporative research network which is highly recommended for materials science research. I am associated with an EU-funded project, DRop-IT, for the development of novel lead-free and stable perovskites. A proper research network with chemists, physicists, and electrical engineers provides a cumulative idea for progressing the vision of the project. In parallel, its sophisticated instrumental facilities help with characterisation and performance studies of the materials. As a whole, INAM is the perfect place for friendly and collaborative innovations to foster my research career

**SAMRAT DAS ADHIKARI**
*Postdoctoral Researcher*

# PUBLICATIONS-JOURNALS

## 2021

1. *Applied Physics Letters*, **2021**, 119, 242107-1-6. Almora, O.; Miravet, D.; García-Batlle, M.; Garcia-Belmonte, G. **Ballistic-like space-charge-limited currents in halide perovskites at room temperature**.

2. *Energy Technology*, **2021**, 2100890, 1-8. Ripolles, T.S.; Serafini, P.; Redondo-Obispo, C.; Climent-Pascual, E.; Masi, S.; Mora-Seró, I.; Coya, C. **Interface Engineering in Perovskite Solar Cells by Low Concentration of Phenylethyl Ammonium Iodide Solution in the Antisolvent Step**.

3. *Chemical Reviews*, **2021**, 121, 14430–14484. Guerrero, A.; Bisquert, J.; Garcia-Belmonte, G. **Impedance Spectroscopy of Metal Halide Perovskite Solar Cells from the Perspective of Equivalent Circuits**.

4. *Biomaterials Science*, 2**021**, 9, 5397-5406. Wales, D.; Miralles-Comins, S.; Franco-Castillo, I.; Cameron, J.M.; Cao, Q.; Karjalainen, E.; Fernandes, J. Alves; Newton, G.N.; Mitchell, S.G.; Sans, V. **Decoupling manufacturing from application in additive manufactured antimicrobial materials**.

5. *American Journal of Biomedical Science & Research*, **2021**, 244-253. Macko, J.; Echeverría-Arrondo, C.; Podrojková, N.; Barrera, Y. Angelina B.; Kindi, H.; Sisáková, K.; Gorejová, R.; Jendželovsky, R.; Buľková, V.; Mora-Seró, I.; Sans, V.; Oriňaková, R.; Groth, T.; Oriňak, A. **Carbonyl Iron Foam Surfaces Modified with Poly (L-Lysine) As Smart Surface for Bone Implan**t.

6. *Journal of Materials Chemistry A*, **2021**, Sanchez, S.; Carlsen, B.; Skorjanc, V.; Flores, N.; Serafini, P.; Mora-Seró, I.; Schouwink, P.; Zakeeruddin, S.M.; Graetze, M.; Hagfeldt, A. **Thermodynamic stability screening of IR-photonic processed multication halide perovskite thin films**.

7. *ACS Applied Energy Materials*, **2021**, Redondo-Obispo, C.; Serafini, P.; Climent-Pascual, E.; Ripolles, T.S.; Mora-Seró, I.; de Andrés, A.; Coya, C. **Effect of Pristine Graphene on Methylammonium Lead Iodide Films and Implications on Solar Cell Performance**.

8. *Solar RRL*, **2021**, 2100723, 1-8. Fernández-Climent, R.; Gualdrón-Reyes, A.F.; Garcia-Tecedor, M.; Mesa, C.A.; Cardenas-Morcoso, D.; Montañés, L.; Barea, E.M.; Mas-Marzá, E.; Julián-López, B.; Mora-Seró, I.; Giménez, S. Switchable **All Inorganic Halide Perovskite Nanocrystalline Photoelectrodes for Solar-Driven Organic Transformations**.

9. *ACS Energy Letters*, **2021**, 6, 10, 3750–3752. Ma, D.; Mora-Seró, I.; Saliba, M.; Etgar, L. **Energy Spotlight Stabilization of Perovskite Solar Cells**.

10. *Chemistry of Materials*, **2021**, 33, 22, 8745–8757. Lee, C.H.; Shin, Y.J.; Villanueva-Antolí, A.; Adhikari, S. Das; Rodríguez-Pereira, J.; Macak, J.M.; Mesa, C.A.; Giménez, S.; Yoon, S. Joon; Gualdrón-Reyes, A.F.; Mora-Seró, I. **Efficient and Stable Blue- and Red-Emitting Perovskite Nanocrystals through Defect Engineering: PbX2 Purification**.

11. *Advanced Energy Materials*, 2021, 2102526. Almora, O. Device Performance of Emerging Photovoltaic Materials (Version 2).

12. *The Journal of Physical Chemistry Letters*, 2021, 12, 11005–11013. Bisquert, J. A Frequency Domain Analysis of the Excitability and Bifurcations of the FitzHugh–Nagumo Neuron Model.

13. *Catalysts*, 2021, 11, 1244. Montañés, L.; Mesa, C.A.; Gutierrez-Blanco, A.; Robles, C.; Julián-López, B.; Giménez, S. Facile Surfactant-Assisted Synthesis of BiVO4 Nanoparticulate Films for Solar Water Splitting.

14. *Green Chemistry*, 2021, 23, 8061-8068. Gouda, L.; Sévery, L.; Moehl, T.; Mas-Marzá, E.; Adams, P.; Fabregat-Santiago, F.; Tilley, D. Tuning the selectivity of biomass oxidation over oxygen evolution on NiO–OH electrodes.

15. *Angewandte Chemie International Edition*, 2021, 60, 20003-20011. Ruíz-Zambrana, C.; Gutierrez-Blanco, A.; Gonell, S.; Poyatos, M.; Peris, E. Redox-Switchable Cycloisomerization of Alkynoic Acids with Napthalenediimide-Derived N-Heterocyclic Carbene Complexes.

16. *Dalton Transactions*, 2021, 50, 12748-12763. Poyatos, M.; Peris, E. Insights into the past and future of Janus-di-N-heterocyclic carbenes.

17. *European Journal of Inorganic Chemistry*, 2021, 2434-2545. Gutierrez-Blanco, A.; Dobbe, C.; Hepp, A.; Daniliuc, C.G.; Poyatos, M.; Hahn, E.; Peris, E. Synthesis and Characterization of Poly-NHC-Derived Silver(I) Assemblies and Their Transformation into Poly-Imidazolium Macrocycles.

18. *Nature Electronics*, 2021, 4, 681–688. Deumel, S.; van Breemen, A.; Gelinck, G.; Peeters, B.; Maas, J.; Verbeek, R.; Shanmugam, S.; Akkerman, H.; Meulenkamp, E.; Huerdler, J.E.; Acharya, M.; García-Batlle, M.; Almora, O.; Guerrero, A.; Garcia-Belmonte, G.; Heiss, W.; Schmidt, O.; Tedde, S.F. High-sensitivity high-resolution X-ray imaging with soft-sintered metal halide perovskites.

19. *Journal of Luminescence*, 2021, 240, 118453. Adl, H. Pashaei; Gorji, S.; Munoz-Matutano, G.; Sánchez-Alarcón, R.I.; Abargues, R.; Gualdrón-Reyes, A.F.; Mora-Seró, I.; Martínez-Pastor, J.P. Homogeneous and inhomogeneous broadening in single perovskite nanocrystals investigated by micro-photoluminescence.

20. *International Journal of Hydrogen Energy*, 2021, 46, 23702-23714. Shaddad, M.N.; Arunachalam, P.; Hezam, M.; AL-Saeedan, N.M.; Giménez, S.; Bisquert, J.; Al-Mayouf, A.M. Unprecedented solar water splitting of dendritic nanostructured Bi2O3 films by combined oxygen vacancy formation and Na2MoO4 doping.

21. *Applied Materials Today*, 2021, 24, 101159. Afzali, N.; Keshavarzi, R.; Tangestaninejad, S.; Giménez, S.; Mirkhani, V.; Moghadam, M.; Mohammadpoor-Baltork, I. Multifunctional approach to improve water oxidation performance with MOF-based photoelectrodes.

22. *ACS Energy Letters*, 2021, 6, 3511–3521. Salim, K.M. Muhamme; Masi, S.; Gualdrón-Reyes, A.F.; Sánchez, R.S.; Barea, E.M.; Krečmarová, M.; Sánchez-Royo, J.F.; Mora-Seró, I. Boosting Long-Term Stability of Pure Formamidinium Perovskite Solar Cells by Ambient Air Additive Assisted Fabrication.

23. Alvarez, A.O.; Ravishankar, S.; Fabregat-Santiago, F. Combining Modulated Techniques for the Analysis of Photosensitive Devices.

24. *Solar RRL*, 2021, 2100401, 1-48. Ling, J.K.; Kizhakkedath, P. Kumar Koya; Watson, T.M.; Mora-Seró, I.; Schmidt-Mende, L.; Brown, T.M.; Jose, R. A Perspective on the Commercial Viability of Perovskite Solar Cells.

25. *The Journal of Physical Chemistry C*, 2021, 125, 28, 15614–15622. Macias-Pinilla, D.F.; Planelles, J.; Mora-Seró, I.; Climente, J.I. Comparison between Trion and Exciton Electronic Properties in CdSe and PbS Nanoplatelets.

26. *Catalysts*, 2021, 11, 957, 1-13. Lee, C.H.; Lee, S. Jeong; Shin, Y.J.; Woo, Y.; Han, S.H.; Gualdrón-Reyes, A.F.; Mora-Seró, I.; Yoon, S. Joon Synthetic and Post-Synthetic Strategies to Improve Photoluminescence Quantum Yields in Perovskite Quantum Dots.

27. *Advanced Optical Materials*, 2021, 202101024, 1-9. Adhikari, S. Das; Masi, S.; Echeverría-Arrondo, C.; Miralles-Comins, S.; Sánchez, R.S.; Fernandes, J.Alves; Chirvony, V.S.; Martínez-Pastor, J.P.; Sans, V.; Mora-Seró, I. Continuous-Flow Synthesis of Orange Emitting Sn(II)-Doped CsBr Materials.

28. *Nanomaterials*, 2021, 11, 2024. Aiello, F.; Masi, S. The Contribution of NMR Spectroscopy in Understanding Perovskite Stabilization Phenomena.

29. *The Journal of Physical Chemistry B*, 2021, Bou, A.; Bisquert, J. Impedance Spectroscopy Dynamics of Biological Neural Elements: From Memristors to Neurons and Synapses.

30. *Sustainable Energy & Fuels*, 2021, 5, 3929-3938. Arcas, R.; Koshino, Y.; Mas-Marzá, E.; Tsuji, R.; Ito, S.; Fabregat-Santiago, F. Pencil graphite rods decorated with nickel and nickel-iron as low-cost oxygen evolution reaction electrodes.

31. *The Journal of Physical Chemistry Letters*, 2021, 12, 7964–7971. Bisquert, J.; Janssen, M. From Frequency Domain to Time Transient Methods for Halide Perovskite Solar Cells: The Connections of IMPS, IMVS, TPC, and TPV.

32. *The Journal of Physical Chemistry Letters*, 2021, 12, 7840–7845. Bisquert, J. Unique Curve for the Radiative Photovoltage Deficit Caused by the Urbach Tail.

33. *Energy & Environmental Science*, 2021, Gharibzadeh, S.; Paetzold, U.W. Two Birds with One Stone: Dual Grain-Boundary and Interface Passivation Enables > 22% Efficient Inverted Methylammonium-Free Perovskite Solar Cells.

34. *ACS Physical Chemistry Au*, 2021, 1, Bisquert, J.; Guerrero, A.; Gonzales, C. Theory of Hysteresis in Halide Perovskites by Integration of the Equivalent Circuit.

35. *ACS Applied Materials and Interfaces*, 2021, 13, 35617–35624. García-Batlle, M.; Deumel, S.; Huerdler, J.E.; Tedde, S.F.; Guerrero, A.; Almora, O.; Garcia-Belmonte, G. Mobile Ion-Driven Modulation of Electronic Conductivity Explains Long-Timescale Electrical Response in Lead Iodide Perovskite Thick Pellets.

36. *Journal of Chemical Informatics and Modeling*, 2021, 61, 3604–3614. Galmés, M.À.; Świderek, K.; Moliner, V. Computational Studies Suggest Promiscuous Candida antarctica Lipase B as an Environmentally Friendly Alternative for the Production of Epoxides.

37. *ACS Catalysis*, 2021, 11, 8635–8644. Galmés, M.À.; Nödling, A.R.; Luk, L.; Świderek, K.; Moliner, V. Combined Theoretical and Experimental Study to Unravel the Differences in Promiscuous Amidase Activity of Two Nonhomologous Enzymes.

38. *Advanced Sustainable Systems*, 2021, 2100120. Bi, Z.; Zhang, S.; Thandapani, M.; Zhu, Y.; Zheng, Y.; Liem, N. Quang; Guerrero, A.; Xu, X. High Shunt Resistance SnO2-PbO Electron Transport Layer for Perovskite Solar Cells Used in Low Lighting Applications.

39. *The Journal of Physical Chemistry C*, 2021, Janssen, M.; Bisquert, J. Locating the Frequency of Turnover in Thin-Film Diffusion Impedance.

40. *ACS Applied Energy Materials*, 2021, 4, 5615–5624. Chen, M.; Kamarudin, M. Akmal; Baranwal, A.K.; Kapil, G.; Ripollés-Sanchis, T.; Bisquert, J.; Shen, Q.; Hayase, S. High-Efficiency Lead-Free Wide Band Gap Perovskite Solar Cells via Guanidinium Bromide Incorporation.

41. *ACS Applied Nano Materials*, 2021, 4, 6170–6177. Chirvony, V.S.; Suárez, I.; Rodríguez-Romero, J.; Vázquez-Cárdenas, R.; Sanchez-Diaz, J.; Molina-Sánchez, A.; Barea, E.M.; Mora-Seró, I.; Martínez-Pastor, J.P. Inhomogeneous Broadening of Photoluminescence Spectra and Kinetics of Nanometer-Thick (Phenethylammonium)2PbI4 Perovskite Thin Films: Implications for Optoelectronics.

42. *Advanced Optical Materials*, 2021, 2100807, 1-11. Navarro-Arenas, J.; Suárez, I.; Gualdrón-Reyes, A.F.; Mora-Seró, I.; Bisquert, J.; Martínez-Pastor, J.P. Recycled Photons Traveling Several Millimeters in Waveguides Based on CsPbBr3 Perovskite Nanocrystals.

43. *Nanomanufacturing*, 2021, 1(2), 67-74. La Porta, F.A.; Masi, S. Solvent-Mediated Structural Evolution Mechanism from Cs4PbBr6 to CsPbBr3 Crystals.

44. *Advanced Energy Materials*, 2021, 11, 2100022. Almora, O. Quantifying the Absorption Onset in the Quantum Efficiency of Emerging Photovoltaic Devices.

45. *Solar RRL*, 2021, 5, 2100024. Almora, O. Degradation through Directional Self-Doping and Homogeneous Density of Recombination Centers Hindered by 1,8-Diiodooctane Additive in Non-Fullerene Organic Solar Cells.

46. *Advanced Electronic Materials*, 2021, 7, 2001165. These, A. Characterization of Aerosol Deposited Cesium Lead Tribromide Perovskite Films on Interdigited ITO Electrodes.

47. *Angewandte Chemie International Edition*, 2021, 60, 15412-15417. Vicent, C.; Martínez-Agramunt, V.; Gandhi, V.; Larriba-Andaluz, C.; Gusev, D.G.; Peris, E. Ion Mobility Mass Spectrometry Uncovers Guest-Induced Distortions in a Supramolecular Organometallic Metallosquare.

48. *Chemistry - A European Journal*, 2021, 27, 9661-9665. Ibáñez, S.; Peris, E. Shape-Adaptability and Redox-Switching Properties of a Di-Gold Metallotweezer.

49. *Journal of Chemical Informatics and Modeling*, 2021, 61, 3041–3051. Boneta, S.; Arafet, K.; Moliner, V. QM/MM Study of the Enzymatic Biodegradation Mechanism of Polyethylene Terephthalate.

50. *PROTEINS: Structure, Function and Bioinformatics*, 2021, 1-13. da Costa, C. Henrique S.; Santos, A.M. dos; Alves, C. Nahum; Martí, S.; Moliner, V.; Santana, K.; Lameira, J. Assessment of the PETase conformational changes induced by poly(ethylene terephthalate) binding.

51. *ACS Applied Bio Materials*, 2021, 4, 935-944. Martí-Centelles, R.; Dolz-Pérez, I.; De la O, J.; Ontoria-Oviedo, I.; Sepúlveda, P.; Nebot, V.J.; Vicent, M.J.; Escuder, B. Two-Component Peptidic Molecular Gels for Topical Drug Delivery of Naproxen.

52. *ACS Catalysis*, 2021, 11, 8211–8225. Glanowski, M.; Wójcik, P.; Procner, M.; Borowski, T.; Lupa, D.; Mielczarek, P.; Oszajca, M.; Moliner, V.; Świderek, K.; Bojarski, A.J.; Szaleniec, M. Enzymatic Δ1-Dehydrogenation of 3-Ketosteroids—Reconciliation of Kinetic Isotope Effects with the Reaction Mechanism.

53. *ACS Nano*, 2021, 15, 7, 10775–10981. Hoye, R.L.Z.; Polavarapu, L.; Dey, A.; Ye, J.; Debroye, E.; Ha, S. Kyun; Yin, J.; Yan, F.; Shamsi, J.; Scheel, M.A.; Steele, J.A.; Han, C.; Korgel, B.A.; Mora-Seró, I.; Pérez-Prieto, J.; Bakr, O.M.; Müller-Buschbaum, P.; Stranks, S.D. State of the Art and Prospects for Halide Perovskite Nanocrystals.

54. *ACS Energy Letters*, 2021, 6, 2248–2255. Bou, A.; Abolins, H.; Ashoka, A.; Cruanyes, H.; Guerrero, A.; Deschler, F.; Bisquert, J. Extracting in Situ Charge Carrier Diffusion Parameters in Perovskite Solar Cells with Light Modulated Techniques.

55. *Journal of Computational Chemistry*, 2021, 42, 447–457. Martí, S. QMCube (QM3): An all-purpose suite for multiscale QM/MM calculations.

56. *Chemical Communications*, 2021, 57, 5306–5309. De Raffele, D.; Martí, S.; Moliner, V. A QM/MM study on the origin of retro-aldolase activity of a catalytic antibody.

57. *Chemistry - A European Journal*, 2021, 27, 1-10. Arafet, K.; González, F.V.; Moliner, V. Elucidating the dual mode of action of dipeptidyl enoates in the inhibition of rhodesain cysteine proteases.

58. *Biochemistry*, 2021, 60, 1243-1247. Kholodar, S.A.; Finer-Moore, J.S.; Świderek, K.; Arafet, K.; Moliner, V.; M. Stroud, R.; Kohen, A. Caught in Action: X-ray Structure of Thymidylate Synthase with Noncovalent Intermediate Analog.

59. *ACS Catalysis*, 2021, 11, 3575–3589. Serrano-Aparicio, N.; Moliner, V.; Świderek, K. Nature of Irreversible Inhibition of Human 20S Proteasome by Salinosporamide A. The Critical Role of Lys–Asp Dyad Revealed from Electrostatic Effects Analysis.

60. *Chemical Communications*, 2021, 57, 1919-1922. Santi, N.; Morrill, L.C.; Świderek, K.; Moliner, V.; Luk, L.Y.P. Transfer Hydrogenations catalyzed by Streptavidin-hosted Secondary Amine Organocatalyst.

61. *Chemical Science*, 2021, 12, 1433-1444. Arafet, K.; Serrano-Aparicio, N.; Lodola, A.; Mulholland, A.; González, F.V.; Świderek, K.; Moliner, V. Mechanism of Inhibition of SARS-CoV-2 Mpro by N3 Peptidyl Michael Acceptor Explained by QM/MM Simulations and Design of New Derivatives with Tunable Chemical Reactivity.

62. *Journal of Materials Chemistry A*, 2021, Bucci, A.; Garcia-Tecedor, M.; Corby, S.; Rao, R.; Martin-Diaconescu, V.; Oropeza, F.; O'Shea, V. Antonio An; Durrant, J. Robert; Giménez, S.; Lloret-Fillol, J. Self-Supported Ultra-Active NiO-Based Electrocatalysts for Oxygen Evolution Reaction by Solution Combustion.

63. *ACS Applied Energy Materials*, 2021, Noguera, J.; Garcia-Tecedor, M.; Royo, J. Francisco; Liñan, L. María Val; de la Mata, M.; Herrera-Collado, M.; Molina, S.I.; Abargues, R.; Giménez, S. Solution-processed Ni-based nanocomposite electrocatalysts: An approach to highly efficient Electrochemical Water Splitting.

64. *Trends in Chemistry*, 2021, 3, 499-511. Gualdrón-Reyes, A.F.; Masi, S.; Mora-Seró, I. Progress in halide-perovskite nanocrystals with near-unity photoluminescence quantum yield.

65. *Advanced Energy & Sustainability Research*, 2021, 2000088, 1-17. Vidal, R.; Alberola-Borràs, J.A.; Sánchez-Pantoja, N.; Mora-Seró, I. Comparison of Perovskite Solar Cells with other Photovoltaics Technologies from the Point of View of Life Cycle Assessment.

66. *Applied Surface Science*, 2021, 551, 149387. -MinYoo, S.; -YiLee, S.; Kim, G.; Song, M.K.; Mora-Seró, I.; Yoon, S. Joon; Shin, T.; Lee, S.H.; f, S.Ahn; Song, M.K.; Kim, M.; Lee, H. Joong Preparation of nanoscale inorganic CsPbIxBr3-x perovskite photosensitizers on the surface of mesoporous TiO2 film for solid-state sensitized solar cells.

67. *Advanced Energy & Sustainability Research*, 2021, 2, 2000086. Perkhun, P.; Köntges, W.; Pourcin, F.; Gonzales, C.; Bisquert, J.; Guerrero, A.; Pfannmöller, M.; Dkhil, S.B.; Ackermann, J. High-Efficiency Digital Inkjet-Printed Non-Fullerene Polymer Blends Using Non-Halogenated Solvents.

68. *Physical Chemistry Chemical Physics*, 2021, 23, 4646-4657. Faizan, M.; Xie, J.; Murtaza, G.; Echeverría-Arrondo, C.; Alshahrani, T.; Bhamu, K. Chandra; Laref, A.; Mora-Seró, I.; Khan, S. Haidar A first-principles study of the stability, electronic structure, and optical properties of halide double perovskite Rb2Sn1xTexI6 for solar cell applications.

69. *Journal of Catalysis*, 2021, 394, 113 - 120. Ventura-Espinosa, D.; Martín, S.; García, H.; Mata, J.A. Ligand effects in the stabilization of Gold nanoparticles anchored on the surface of graphene: Implications in catalysis.

70. *Applied Physics Letters*, 2021, 118, 073501. Gonzales, C.; Guerrero, A.; Bisquert, J. Spectral properties of the dynamic state transition in metal halide perovskite-based memristor exhibiting negative capacitance.

71. *Advanced Optical Materials*, 2021, 2001786. Vallés-Pelarda, M.; Gualdrón-Reyes, A.F.; Felip-León, C.; Angulo-Pachón, C.A.; Agouram, S.; Muñoz-Sanjosé, V.; Miravet, J.F.; Galindo, F.; Mora-Seró, I. High Optical Performance of Cyan-Emissive CsPbBr3 Perovskite Quantum Dots Embedded in Molecular Organogels.

72. *ACS Applied Energy Materials*, 2021, 4, 1078−1084. Teymourinia, H.; Gonzales, C.; Gallardo, J. Jesús; Salavati-Niasari, M.; Bisquert, J.; Navas, J.; Guerrero, A. Interfacial Passivation of Perovskite Solar Cells by Reactive Ion Scavengers.

73. *ACS Energy Letters*, 2021, 6, 710−712. Yu, Y.; Mora-Seró, I.; Hicks, J.C. Advances in Storage Batteries, Layered Hybrid Perovskites and Organic Photovoltaics, and Plasma Activated Ammonia Synthesis.

74. *Journal of Materials Chemistry C*, 2021, 9, 1555-1566. Gualdrón-Reyes, A.F.; Macias-Pinilla, D.F.; Masi, S.; Echeverría-Arrondo, C.; Agouram, S.; Muñoz-Sanjosé, V.; Rodríguez-Pereira, J.; Macak, J.M.; Mora-Seró, I. Engineering Sr-doping for enabling long-term stable FAPb1xSrxI3 quantum dots with 100% photoluminescence quantum yield.

75. *ACS Applied Materials and Interfaces*, 2021, Kim, T.Y.; Kim, B. Su; Oh, J.Gyu; Park, S.Chan; Jang, J.; Hamann, T.; Kang, Y.Soo; Bang, J.Ho; Giménez, S.; Kang, Y.Soo Interfacial Engineering at Quantum Dot-Sensitized TiO2 Photoelectrodes for Ultrahigh Photocurrent Generation.

76. *ChemSusChem*, 2021, 14, Garcés-Pineda, F. Andrés; Nguyën, H. Chuong; Blasco-Ahicart, M.; Garcia-Tecedor, M.; Febré, Mde Fez; Tang, P.Y.; Arbiol, J.; Giménez, S.; Galán-Mascarós, J. Ramón; López, N. Push-pull electronic effects in surface active sites enhance electrocatalytic oxygen evolution on transition metal oxides.

77. *Nature Communications*, 2021, 12, 231. Weilhard, A.; Argent, S.P.; Sans, V. Efficient carbon dioxide hydrogenation to formic acid with buffering ionic liquids.

78. *ACS Applied Polymer Materials*, 2021, 3, 200−208. Sen, S.; Goodwin, S.E.; Barbará, P. Verdía; Rance, G.A.; Wales, D.; Cameron, J.; Sans, V.; Mamlouk, M.; Scott, K.; Walsh, D.A. Gel−Polymer Electrolytes Based on Poly (Ionic Liquid)/Ionic Liquid Networks.

79. *Nature Energy*, 2021, Hernandez, E. Velilla; Jaramillo, F.; Mora-Seró, I. High-Throughput analysis of ideality factor to evaluate outdoor performance of perovskite solar mini modules.

80. *Chemistry of Materials*, 2021, 33, 1, 420−429. Macias-Pinilla, D.F.; Echeverría-Arrondo, C.; Gualdrón-Reyes, A.F.; Agouram, S.; Muñoz-Sanjosé, V.; Planelles, J.; Mora-Seró, I.; Climente, J.I. Morphology and Band Structure of Orthorhombic PbS Nanoplatelets: An Indirect Band Gap Material.

81. *Sustainable Energy & Fuels*, 2021, 5, 956-962. Arcas, R.; Peris, E.; Mas-Marzá, E.; Fabregat-Santiago, F. Revealing the contribution of singlet oxygen in the photoelectrochemical oxidation of benzyl alcohol.

## 2020

1. *Sustainable Energy & Fuels*, 2020, 4, 6227-6233. Han, L.; González-Cobos, J.; Sánchez-Molina, I.; Giancola, S.; Folkman, S.J.; Giménez, S.; Vidal-Ferran, A.; Mascaros, J. Ramón Ga A low temperature aqueous formate fuel cell using cobalt hexacyanoferrate as a non-noble metal oxidation catalyst.

2. *ACS Sustainable Chemistry & Engineering*, 2020, 8, 18366−18376. Afzali, N.; Tangestaninejad, S.; Keshavarzi, R.; Mirkhani, V.; Nematollahi, J.; Moghadam, M.; Mohammadpoor-Baltork, I.; Reimer, M.; Olthof, S.; Klein, A.; Giménez, S. Hierarchical Ti-Based MOF with Embedded RuO2 Nanoparticles: a Highly Efficient Photoelectrode for Visible Light Water Oxidation.

3. *Organometallics*, 2020, 39, 4078−4084. Ibáñez, S.; Gussev, D.; Peris, E. Unexpected Influence of Substituents on the Binding Affinities of Polycyclic Aromatic Hydrocarbons with a Tetra-Au(I) Metallorectangle.

4. *Nature Sustainability*, 2020, Vidal, R.; Alberola-Borràs, J.A.; Habisreutinger, S.N.; Gimeno-Molina, J.L.; Moore, D.T.; Schloemer, T.H.; Mora-Seró, I.; Berry, J.J.; Luther, J.M. Assessing health and environmental impacts of solvents for producing perovskite solar cells.

5. *Advanced Optical Materials*, 2020, 2001508, 1-6. Rad, R. Rafiei; Gualdrón-Reyes, A.F.; Masi, S.; Ganji, B. Azizollah; Taghavinia, N.; Gené-Marimon, S.; Palomares, E.; Mora-Seró, I. Tunable Carbon−CsPbI3 Quantum Dots for White LEDs.

6. *ACS Photonics*, 2020, 7, 11, 3152−3160. Adl, H. Pashaei; Gorji, S.; Habil, M. Karimi; Suárez, I.; Chirvony, V.S.; Gualdrón-Reyes, A.F.; Mora-Seró, I.; Valencia, L.M.; de la Mata, M.; Hernández-Saz, J.; Molina, S.I.; Zapata-Rodríguez, C.J.; Martínez-Pastor, J.P. Purcell Enhancement and Wavelength Shift of Emitted Light by CsPbI3 Perovskite Nanocrystals Coupled to Hyperbolic Metamaterials.

7. *Journal of Materials Chemistry C*, 2020, 8, 14834-14844. Piatkowski, P.; Masi, S.; Galar, P.; Tovar, M. Gutierrez; Ngo, T. Tuyen; Seró, I. Mora; Douhal, A. Deciphering the role of quantum dot size in the ultrafast charge carrier dynamics at the perovskite−quantum dot interface.

8. *Advanced Energy Materials*, 2020, 2002422, 2-9. Sánchez-Godoy, H. Emmanuel; Erazo, E. Ansisar; Gualdrón-Reyes, A.F.; Khan, A. Hossain; Agouram, S.; Barea, E.M.; Rodriguez, R. Arturo; Zarazua, I.; Ortiz, P.; Cortés, M. Teresa; Muñoz-Sanjosé, V.; Moreels, I.; Masi, S.; Mora-Seró, I. Preferred Growth Direction by PbS Nanoplatelets Preserves Perovskite Infrared Light Harvesting for Stable, Reproducible, and Efficient Solar Cells.

9. *Chemistry - A European Journal*, 2020, 26, 11565-11570. Dobbe, C.; Gutierrez-Blanco, A.; Tan, T. Tsai Yuan; Hepp, A.; Poyatos, M.; Peris, E.; Hahn, E. Template-Controlled Synthesis of Polyimidazolium Salts by Multiple [2+2] Cycloaddition Reactions.

10. *Sustainable Energy & Fuels*, 2020, 4, 5024-5030. Corby, S.; Garcia-Tecedor, M.; Tengeler, S.; Steinert, C.; Moss, B.; Mesa, C.A.; Heiba, H.F.; Wilson, A.A.; Kaiser, B.; Jaegermann, W.; Francàs, L.; Giménez, S.; Durrant, J. Robert Separating Bulk and Surface Processes in NiOx Electrocatalysts for Water Oxidation.

11. *Sustainable Energy & Fuels*, 2020, Fernández-Climent, R.; Giménez, S.; Garcia-Tecedor, M. The Role of Oxygen Vacancies on Water Splitting Photoanodes.

12. *The Journal of Physical Chemistry Letters*, 2020, 11, 8654–8659. Bou, A.; Pockett, A.; Raptis, D.; Watson, T.M.; Carnie, M.J.; Bisquert, J. Beyond Impedance Spectroscopy of Perovskite Solar Cells: Insights from the Spectral Correlation of the Electrooptical Frequency Techniques.

13. *The Journal of Physical Chemistry Letters*, 2020, 11, 8417–8423. Alvarez, A.O.; Arcas, R.; Aranda, C.; Bethencourt, L.; Mas-Marzá, E.; Saliba, M.; Fabregat-Santiago, F. Negative Capacitance and Inverted Hysteresis: Matching Features in Perovskite Solar Cells.

14. *Journal of Catalysis*, 2020, 385, 1-9. Weilhard, A.; Salzmann, K.; Navarro, M.; Dupont, J.; Albrecht, M.; Sans, V. Catalyst design for highly efficient carbon dioxide hydrogenation to formic acid under buffering conditions.

15. *Angewandte Chemie International Edition*, 2020, 59, 14331-14335. Martin, C.; Kastner, K.; Cameron, J.; Hampson, E.; Fernandes, J.A.; Gibson, E.K.; Walsh, D.A.; Sans, V.; Newton, G.N. Redox-active hybrid polyoxometalate-stabilised Au nanoparticles.

16. *Current Opinion in Green and Sustainable Chemistry*, 2020, 25, 100367. Sans, V. Emerging trends in flow chemistry enabled by 3D printing: Robust reactors, biocatalysis and electrochemistry.

17. *Advanced Electronic Materials*, 2020, 6, 2000485. García-Batlle, M.; Baussens, O.; Amari, S.; Zaccaro, J.; Gros-Daillon, E.; Verilhac, J.-M.; Guerrero, A.; Garcia-Belmonte, G. Moving Ions Vary Electronic Conductivity in Lead Bromide Perovskite Single Crystals through Dynamic Doping.

18. *Frontiers in Materials*, 2020, 7, 273. Vallés-Pelarda, M.; Sánchez, R.S.; Barea, E.M.; Mora-Seró, I.; Julián-López, B. Up-Converting Lanthanide-Doped YAG Nanospheres.

19. *Materials Advances*, 2020, 1, 1202-1211.
Cardenas-Morcoso, D.; Garcia-Tecedor, M.; Merdzhanova, T.; Smirnov, V.; Finger, F.; Kaiser, B.; Jaegermann, W.; Giménez, S. An Integrated Photoanode Based on Non-Critical Raw Materials for Robust Solar Water Splitting.

20. *ACS Applied Energy Materials*, 2020, Han, L.; González-Cobos, J.; Sánchez-Molina, I.; Giancola, S.; Folkman, S.J.; Tang, P.; Heggen, M.; Dunin-Borkowski, R.E.; Arbiol, J.; Giménez, S.; Galán-Mascarós, J. Ramón Cobalt hexacyanoferrate as a selective and high current densi-ty formate oxidation electrocatalyst.

21. *Nanomaterials*, 2020, 10 (8), 1586. Erazo, E. Ansisar; Sánchez-Godoy, H.E.; Gualdrón-Reyes, A.F.; Masi, S.; Mora-Seró, I. Photo-Induced Black Phase Stabilization of CsPbI3 QDs Films.

22. *ACS Applied Electronic Materials*, 2020, 2, 8, 2525–2534. Salim, K.M. Muhamme; Hassanabadi, E.; Masi, S.; Gualdrón-Reyes, A.F.; Franckevicius, M.; Devižis, A.; Gulbinas, V.; Fakharuddin, A.; Mora-Seró, I. Optimizing Performance and Operational Stability of CsPbI3 Quantum-Dot-Based Light-Emitting Diodes by Interface Engineering.

23. *Journal of Applied Physics*, 2020, 128, 075104. Almora, O.; González-Lezcano, A.; Guerrero, A.; Brabec, C.J.; Garcia-Belmonte, G. Ion-mediated hopping electrode polarization model for impedance spectra of CH3NH3PbI3.

24. *Accounts of Chemical Research*, 2020, 53, 1401–1413. Ibáñez, S.; Poyatos, M.; Peris, E. N-Heterocyclic Carbenes: A Door Open to Supramolecular Organometallic Chemistry.

25. *Journal of Organometallic Chemistry*, 2020, 917, 121284. Ibáñez, S.; Poyatos, M.; Peris, E. Preparation and self-aggregation properties of a series of pyrene-imidazolylidene complexes of gold (I).

26. *Advanced Energy Materials*, 2020, 2001774. Mora-Seró, I. Current Challenges in the Development of Quantum Dot Sensitized Solar Cells.

27. *Resources Policy*, 2020, 68, 101792. Vidal, R.; Alberola-Borràs, J.A.; Mora-Seró, I. Abiotic depletion and the potential risk to the supply of cesium.
28. *Nanoscale*, 2020, x, x.
Hassanabadi, E.; Latifi, M.; Gualdrón-Reyes, A.F.; Masi, S.; Yoon, S. Joon; Poyatos, M.; Julián-López, B.; Mora-Seró, I. Ligand & band gap engineering: tailoring the protocol synthesis for achieving high-quality CsPbI3 quantum dots.

29. *Physical Review Applied*, 2020, 13, 064071 (1-15). Suárez, I.; Juárez-Pérez, E.J.; Chirvony, V.S.; Mora-Seró, I.; Martínez-Pastor, J.P. Mechanisms of Spontaneous and Amplified Spontaneous Emission in CH3NH3PbI3 Perovskite Thin Films Integrated in an Optical Waveguide.

30. *ACS Applied Energy Materials*, 2020, 3, 5126-5134. Babu, V.; Pineda, R. Fuentes; Ahmad, T.; Alvarez, A.O.; Castriotta, L. Angelo; Di Carlo, A.; Fabregat-Santiago, F.; Wojciechowski, K. Improved Stability of Inverted and Flexible Perovskite Solar Cells with Carbon Electrode.

31. *The Journal of Physical Chemistry C*, 2020, 124, 15793–15799. Ravishankar, S.; García-Batlle, M.; Bisquert, J.; Garcia-Belmonte, G.; Odrobina, J.; Schiller, C.A. Removing Instability-Caused Low-Frequency Features in Small Perturbation Spectra of Perovskite Solar Cells.

32. *Applied Materials Today*, 2020, 20, 100714. Barrio, J.; Gibaja, C.; Garcia-Tecedor, M.; Abisdris, L.; Torres, I.; Karjule, N.; Giménez, S.; Shalom, M.; Zamora, F. Electrophoretic deposition of antimonene for photoelectrochemical applications.

33. *Nano Energy*, 2020, 75, 104982. Almora, O.; Zhao, Y.; Du, X.; Heumueller, T.; Matt, G.J.; Garcia-Belmonte, G.; Brabec, C.J. Light intensity modulated impedance spectroscopy (LIMIS) in all-solid-state solar cells at open-circuit.

34. *Sustainable Energy & Fuels*, 2020, 4, 4003-4007. Guenani, N.I.; Barawi, M.; Villar-García, I.J.; Bisquert, J.; O´Shea, V.A. de la P.; Guerrero, A. Highly porous Ti-Ni anodes for electrochemical oxidations.

35. *ACS Energy Letters*, 2020, 5, 2024–2026. Milić, J.V.; Ehrler, B.; Saliba, M.; Molina, C.; Bisquert, J. Online Meetings in Times of Global Crisis: Toward Sustainable Conferencing.

36. *Energy Technology*, 2020, 8, 2000301. Lemsi, A.; Cardenas-Morcoso, D.; Haro, M.; Gil-Barrachina, C.; Aranda, C.; Maghraoui-Meherzi, H.; Garcia-Tecedor, M.; Giménez, S.; Julián-López, B. PbS nanocubes for solar energy storage.

37. *ACS Energy Letters*, 2020, 5, 1974-1985. Masi, S.; Gualdrón-Reyes, A.F.; Mora-Seró, I. Stabilization of Black Perovskite Phase in FAPbI3 and CsPbI3.

38. *ACS Energy Letters*, 2020, 5, 1013-1021. Rodríguez-Romero, J.; Sanchez-Diaz, J.; Echeverría-Arrondo, C.; Masi, S.; Esparza, D.; Barea, E.M.; Mora-Seró, I. Widening the 2D/3D Perovskite Family for Efficient and Thermal-Resistant Solar Cells by the Use of Secondary Ammonium Cations.

39. *Nature Energy*, 2020, Mora-Seró, I. Turn defects into strengths.

40. *Applied Physics Letters*, **2020**, 116, 183503. Caram, J.; García-Batlle, M.; Almora, O.; Arce, R.D.; Guerrero, A.; Garcia-Belmonte, G. **Direct observation of surface polarization at hybrid perovskite/Au interfaces by dark transient experiments**.

41. *Nanomaterials*, **2020**, 10, 872. Marand, Z. Rezay; Kermanpur, A.; Karimzadeh, F.; Barea, E.M.; Hassanabadi, E.; Anaraki, E. Halvani; Julián-López, B.; Masi, S.; Mora-Seró, I. **Structural and Electrical Investigation of Cobalt-Doped NiOx/Perovskite Interface for Efficient Inverted Solar Cells**.

42. *ACS Energy Letters*, **2020**, 5, 1662-1664. Lu, J.; Ma, D.; Mora-Seró, I. **Energy Spotlight**.

43. *Angewandte Chemie International Edition*, **2020**, 59, 6860-6865. Ibáñez, S.; Peris, E. **Dimensional Matching versus Induced-Fit Distortions: Binding Affinities of Planar and Curved Polyaromatic Hydrocarbons with a Tetragold Metallorectangle**.

44. *Dalton Transactions*, **2020**, 49, 3181-3186. Ruiz-Botella, S.; Vidossich, P.; Ujaque, G.; Peris, E. **A resorcinarene-based tetrabenzoimidazolylidene complex of rhodium**.

45. *ChemSusChem*, **2020**, 13, 1-7.
Yoo, S.M.; Lee, S.Y.; Hernandez, E. Velilla; Kim, M.; Kim, G.; Shin, T.; Nazeeruddin, M.K.; Mora-Seró, I.; Lee, H. **Joong Nanoscale Perovskite-Sensitized Solar Cell Revisited: Dye-Cell or Perovskite-Cell?**.

46. *Applied Physics Letters*, **2020**, 116, 113502. Ghosh, S.; Singh, R.; Subbiah, A.S.; Boix, P.P.; Seró, I. Mora; Sarkar, S.S. **Enhanced operational stability through interfacial modification by active encapsulation of perovskite solar cells**.

47. *Physica Status Solidi (a)*, **2020**, 217, 2000065. Moreels, I.; Brovelli, S.; Ribierre, J.C.; Mora-Seró, I. **Semiconductor Nanostructures for Electronic and Opto-Electronic Device Applications**.

48. *Solar RRL*, **2020**, 4, 1900563. Mora-Seró, I.; Saliba, M.; Zhou, Y. **Towards the Next Decade for Perovskite Solar Cells**.

49. *APL Materials*, **2020**, 8, 021109. Suárez, I.; Wood, T.; Pastor, J.P. Martine; Balestri, D.; Checcucci, S.; David, T.; Favre, L.; Claude, J.B.; Grosso, D.; Gualdrón-Reyes, A.F.; Mora-Seró, I.; Abbarchi, M.; Gurioli, M. **Enhanced nanoscopy of individual CsPbBr3 perovskite nanocrystals using dielectric sub-micrometric antennas**.

50. *Journal of Luminescence*, **2020**, 221, 117092. Chirvony, V.S.; Sekerbayev, K.S.; Adl, H. Pashaei; Suárez, I.; Taurbayev, Y.T.; Gualdrón-Reyes, A.F.; Mora-Seró, I.; Martínez-Pastor, J.P. **Interpretation of the photoluminescence decay kinetics in metal halide perovskite nanocrystals and thin polycrystalline films**.

51. *ACS Energy Letters*, **2020**, 5, 418-427. Masi, S.; Echeverría-Arrondo, C.; Salim, K.M. Muhamme; Ngo, T. Tuyen; Mendez, P.F.; Lopez-Fraguas, E.; Macias-Pinilla, D.F.; Planelles, J.; Climente, J.I.; Mora-Seró, I. **Chemi-Structural Stabilization of Formamidinium Lead Iodide Perovskite by Using Embedded Quantum Dots**.

52. A*CS Energy Letters*, **2020**, 5, 187-191. Cardenas-Morcoso, D.; Bou, A.; Ravishankar, S.; Garcia-Tecedor, M.; Giménez, S.; Bisquert, J. **Intensity-Modulated Photocurrent Spectroscopy for Solar Energy Conversion Devices: What Does a Negative Value Mean?**.

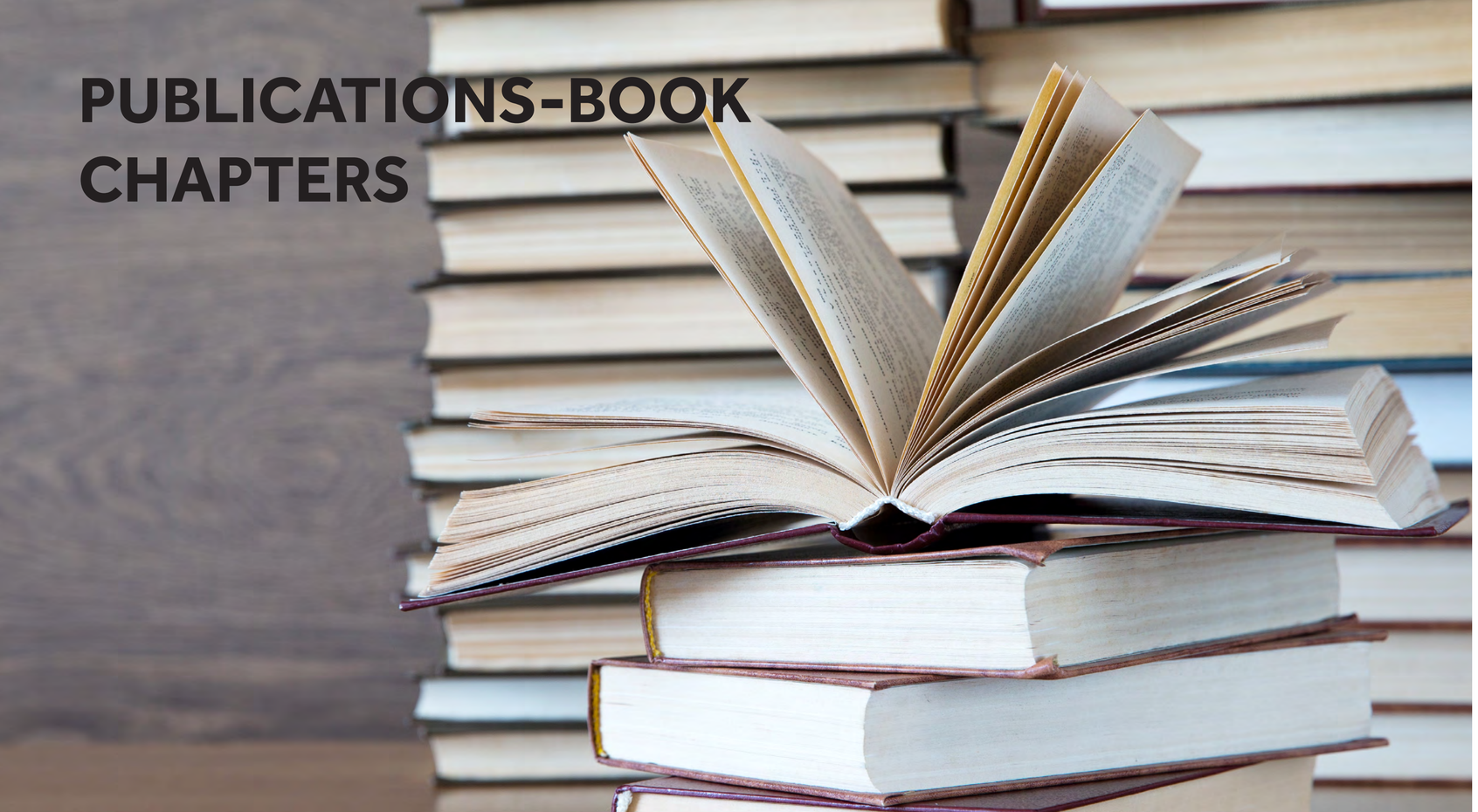
53. *ACS Applied Materials and Interfaces*, **2020**, 12, 914−924. Gualdrón-Reyes, A.F.; Rodríguez-Pereira, J.; Amado-Gonzalez, E.; Rueda-P, J.; Ospina, R.; Masi, S.; Yoon, S. Joon; Tirado, J.; Jaramillo, F.; Agouram, S.; Muñoz-Sanjose, V.; Giménez, S.; Mora-Seró, I. **Unravelling the Photocatalytic Behavior of All-Inorganic Mixed Halide Perovskites: The Role of Surface Chemical State**s.

54. *The Journal of Physical Chemistry Letters*, **2020**, 11, 463-470. Solanki, A.; Guerrero, A.; Zhang, Q.; Bisquert, J.; Sum, T. **Chien Interfacial Mechanism for Efficient Resistive Switching in Ruddlesden–Popper Perovskites for Non-volatile Memories**.

55. *Applied Physics Letters*, **2020**, 116, 013901. Almora, O.; Miravet, D.; Matt, G.J.; Garcia-Belmonte, G.; Brabec, C.J. **Analytical model for light modulating impedance spectroscopy (LIMIS) in all-solid-state p-n junction solar cells at open-circuit**.

56. *Applied Catalysis B: Environmental*, **2020**, 260, 118110. Cano, I.; Martin, C.; Fernandes, J.A.; Lodge, R.W.; Dupont, J.; Casado-Carmona, F.A.; Lucena, R.; Cardenas, S.; Sans, V.; de Pedro, I. **Paramagnetic Ionic Liquid-Coated SiO2@ Fe3O4 Nanoparticles-the Next Generation of Magnetically Recoverable Nanocatalysts Applied in the Glycolysis of PET**.

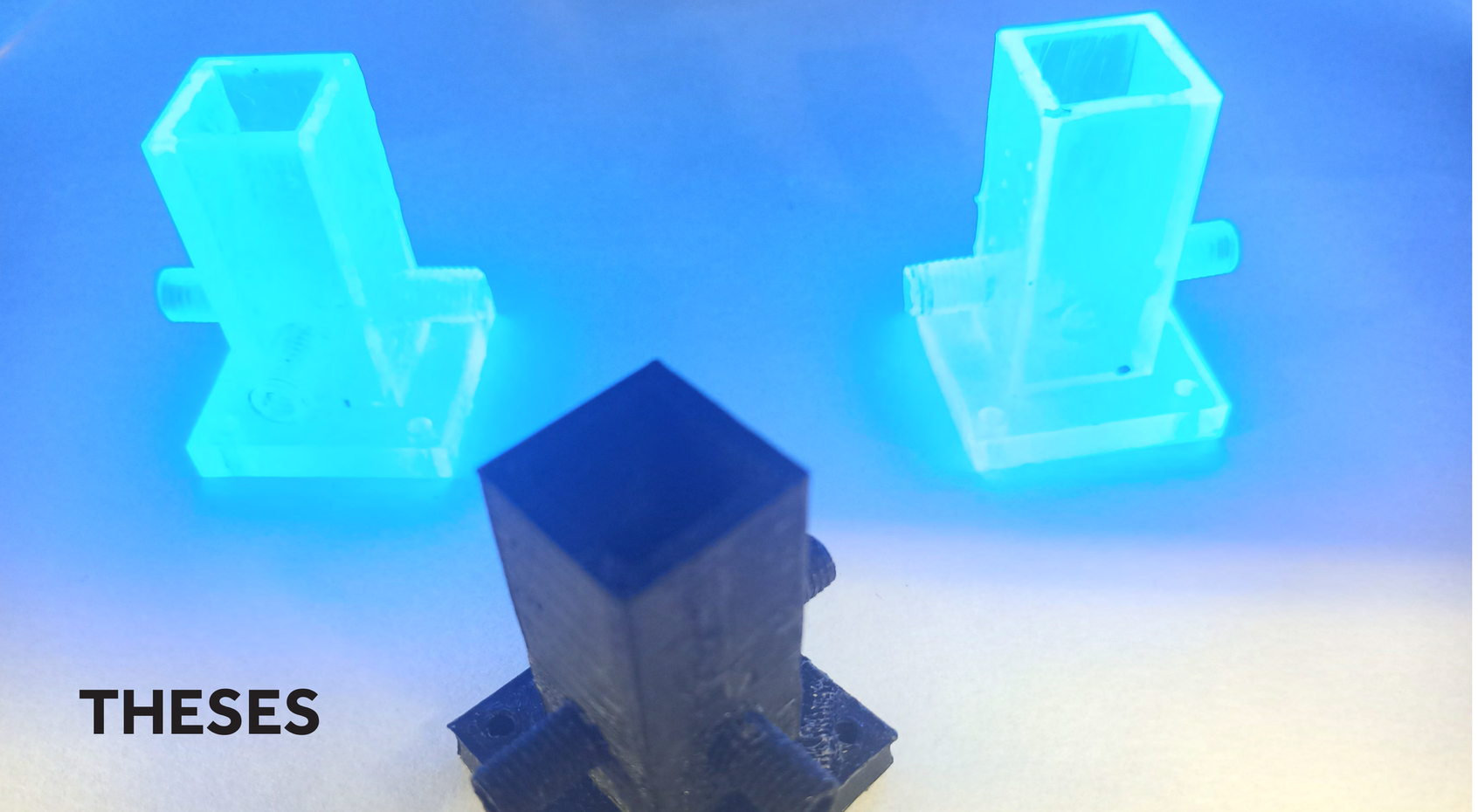
# PUBLICATIONS-BOOK CHAPTERS



Catalysis at the Confined Interface of Supramolecular Gels.
Rosa Martí Centelles; Beatriu Escuder, in Reactivity in Confined Spaces, 2021, Eds.; Ross S. Fogan; Gareth O. Lloyd. The Royal Society of Chemistry, pp 206-246.

Exothermic advanced manufacturing techniques in reactor engineering: 3D printing applications in flow chemistry.
S Miralles-Comins, E Alvarez, P Lozano, V Sans, in Reactivity in Flow Chemistry, 259, 2021.

Outdoor Performance of Perovskite Photovoltaic Technology.
Esteban Velilla Hernández, Juan Bernardo Cano Quintero, Juan Felipe Montoya, Iván Mora-Seró and Franklin Jaramillo Isaza, In Thin Film Photovoltaics, 2021, Eds.; IntechOpen.



# THESES

Title: **Tetrametallic (gold, iridium and rhodium) complexes based on N-heterocyclic carbenes.**
Author: Ana Maria Gutiérrez Blanco
Supervised by: Prof. Dr Eduardo Peris and Dr Macarena Poyatos
Date of defence: 03/05/2021

Title: **Nickel and palladium supramolecular organometallic complexes based on NHC ligands with polyaromatic moieties for host-guest chemistry studies.**
Author: Victor Martinez Agramunt
Supervised by: Prof. Dr Eduardo Peris
Date of defence: 16/10/2021

Title: **Development of new hybrid materials based on graphene functionalized with molecular complexes. Evaluation of properties and catalytic applications**.
Author: David Ventura
Supervised by: Prof. Dr José Mata
Date of defence: 10/07/2020

Title: **Hysteresis and Capacitive Features of Perovskite Solar Cells**.
Author: Osbel Almora
Supervised by: Germà Garcia-Belmonte
Date of defence: 19/06/2020



Title: **Advanced Semiconductors for Photo-electrocatalytic Solar Fuel Production**.
Author: Drialys Cárdenas Morcoso
Supervised by: Sixto Giménez
Date of defence: 20/07/2020

# RESEARCH PROJECTS

## INTERNATIONAL FUNDING

Title: Efficient CO2 capture and valorisation with 3D printed catalytic reactors
Acronym of the project: 3DOPILCAT
Funding entity: European Commission
Modality: H2020-MSCA-IF-2020 MARIE CURIE INDIVIDUAL FELLOWSHIP
Entity code: 8286/2019
Principal researchers: Sixto Gimenez Juliá
Dates: 2021-2023
Total amount: €172,932

Title: Novel photo-assisted systems for direct Solar-driven redUctioN of CO2 to energy rich CHEMicals
Acronym of the project: SUN2CHEM
Funding entity: European Commission
Modality: H2020-SC3-SC3-RES-29-2019
Entity code: 8286/2019
Principal researchers: Sixto Gimenez Juliá
Dates: 2020-2023
Total amount: €316,248

Title: Ground- breaking Perovskite Technologies for Advanced X-Ray medical imaging systems
Acronym of the project: PEROXIS
Funding entity: European Commission
Modality: H2020-ICT-2018-2020
Entity code: 7836/2018
Principal researchers: Germà Garcia-Belmonte
Dates: 2020-2023
Total amount: €376,032

Title: DROP-IT – Drop- on demand flexible optoelectronics & photovoltaics perovskites
Acronym of the project: DROP-IT
Funding entity: European Commission
Modality: FETOPEN-01-2019
Entity code: 862656
Principal researchers: Iván Mora-Seró
Dates: 2019-2022
Total amount: €424,277

Title: No-Limit - Boosting Photovoltaic Performance by the Synergistic Interaction of Halide Perovskites And Semiconductor Quantum Dots
Acronym of the project: NO LIMIT
Funding entity: ERC- European Research Council
Modality: ERC consolidator
Entity code: ERC-2016-COG/ERC-2016-COG-724424
Principal researchers: Iván Mora-Seró
Dates: 2017-2022
Total amount: €2,000,000

Title: An Artificial Leaf: a photo-electro-catalytic cell from earth-abundant materials for sustainable solar production of CO2-based chemicals and fuels
Acronym of the project: ALEAF
Funding entity: European Commission
Modality: Collaborative project H2020-FETPROACT
Entity code: 732840
Principal researchers: Juan Bisquert, Sixto Giménez
Dates: 2017-2020
Total amount: €443,770

Title: Making Perovskites Truly Exploitable
Acronym of the project: MAESTRO
Funding entity: European Union
Modality: European Training Networks (MSCA-ITN-ETN)
Entity code: 764787
Principal researchers: Francisco Fabregat-Santiago
Dates: 2017-2021
Total amount: €227,137

# NATIONAL PROJECTS

Title: Fabricación avanzada para procesos de cristalización de perovskitas
Funding entity: Ministerio de Ciencia e Innovación
Modality: Convocatoria del programa estatal de I+D+I orientada a los retos de la sociedad
Entity code: PID2020-119628RB-C33
Principal researchers: Victor Sans Sangorrin
Dates: 2021-2024
Total amount: €90,750

Title: Desarrollo de sistemas electrocatalíticos integrados para la síntesis de productos químicos de alto valor añadido
Acronym of the project: ECOCAT
Funding entity: Ministerio de Ciencia e Innovación
Modality: Convocatoria de ayudas correspondientes al programa estatal fomento de la investigación
Entity code: PID2020-116093RB-C41
Principal researchers: Sixto Giménez
Dates: 2021-2024
Total amount: €229,900

Title: Convocatoria Juan de la Cierva Formación Silver Turren
Funding entity: Ministerio de Ciencia e Innovación
Modality: Juan de la Cierva formación
Entity code: FJC2019-041835-I
Principal researchers: Iván Mora-Seró
Dates: 2021-2023
Total amount: €50,000

Title: Convocatoria Juan de la Cierva Incorporación Sergio Gonell
Funding entity: Ministerio de Ciencia e Innovación
Modality: Juan de la cierva incorporación
Entity code: IJC2019-039982-I
Principal researchers: Eduardo Peris
Dates: 2021-2024
Total amount: €75,000

Title: Perovskitas hibridas estables por control de dimensionalidad e interfaces
Acronym of the project: PHYDIM
Funding entity: Ministerio de Ciencia e Innovación
Modality: Programa Estatal de I+D+i Orientada a los Retos de la Sociedad
Entity code: PID2019-107348GB-100
Principal researchers: Juan Bisquert
Dates: 2020-2023
Total amount: €254,000

Title: Nuevas perovskitas de haluro obtenidas mediante la estabilización de la fase Perovskita a través de la energía superficial para dispositivos optoelectrónicos avanzados
Acronym of the project: STABLE
Funding entity: Ministerio de Ciencia e Innovación
Modality: Programa Estatal de I+D+i Orientada a los Retos de la Sociedad
Entity code: PID2019-107314RB-100
Principal researchers: Iván Mora-Seró
Dates: 2020-2023
Total amount: €242,000

Title: Síntesis de productos de alto valor añadido mediante sistemas fotoelectrocatalíticos avanzados
Acronym of the project: VALPEC
Funding entity: Ministerio de Ciencia e Innovación
Modality:
Entity code: ENE2017-85087-C3-1-R
Principal researchers: Francisco Fabregat-Santiago/Sixto Gimenez
Dates: 2018-2020
Total amount: €194,810

Title: Supramolecular Organometallic Structures for Catalysis and Molecular Recognition
Acronym of the project: SUPRACAT
Funding entity: Ministerio de Ciencia e Innovación
Modality: Ayuda Estatal Fomento de la Excelencia
Entity code: PGC2018-093382-B-I00
Principal researchers: Eduardo Peris
Dates: 2019-2021
Total amount: €145,000

Title: Funcionalización de grafeno con complejos metálicos definidos en transformaciones catalíticas sostenibles: Almacenamiento de hidrógeno y conversión de biomasa.
Acronym of the project: FG-Cat
Funding entity: MINECO
Modality: Programa Estatal de I+D+i Orientada a los Retos de la Sociedad
Entity code: RTI2018-098237-B-C22
Principal researchers: Jose Mata
Dates: 2019-2021
Total amount: €60,000

Title: perovskitas para conversión de energía solar y optoelectrónica
Acronym of the project: Red Perovskita
Funding entity: Ministerio de Ciencia e Innovación
Modality: convocatoria de ayudas correspondientes al programa estatal fomento de la investigación científica y técnica de excelencia
Entity code: ENE2017-90565-REDT
Principal researchers: Juan Bisquert
Dates: 2019-2020
Total amount: €19,000

# REGIONAL PROJECTS

Title: **Plataforma inteligente para la fabricación escalable de materiales avanzados**
Funding entity: Generalitat Valenciana
Modality: IDIFEDER 2021 -2022
Entity code: IDIFEDER/2021/029
Principal researchers: Juan Bisquert
Dates: 2021-2022
Total amount: €394,515

Title: **Diseño de fármacos asistido por ordenador para el tratamiento de la covid-19 mediante el uso de "machine learning" y métodos "qm/mm"**
Funding entity: Generalitat Valenciana
Modality: IDIFEDER 2021 -2022
Entity code: IDIFEDER/2021/027
Principal researchers: Vicent Moliner
Dates: 2021-2022
Total amount: €394,915

Title: **Materiales avanzados 2d/3d para soluciones eficientes en la producción y el almacenamiento de energía sostenible**
**Acronym of the project: SOLPEN**
Funding entity: Generalitat Valenciana
Modality: Programa PROMETEU
Entity code: PROMETEO/2020/028
Principal researchers: Juan Bisquert
Dates: 2020-2023
Total amount: €248,814

Title: **Recubrimientos funcionales para aplicaciones tecnológicas**
Funding entity: Generalitat Valenciana
Modality: IDIFEDER 2020-2021
Entity code: IDIFEDER/2020/013
Principal researcher: Juan Bisquert
Dates: 2020-2021
Total amount: €898,529

Title: **Integrating Design Across the Scales (IDEAS): from molecules to active devices with Additive manufacturing**
**Acronym of the project: CIDEGENT**
Funding entity: Generalitat Valenciana
Modality: CONVOCATORIA 2018 DE SUBVENCIONES DEL PROGRAMA PARA EL APOYO A PERSONAS INVESTIGADORAS CON TALENTO-PLAN GENT
Entity code: CIDEGENT/2018/036
Principal researchers: Victor Sans Sangorrin
Dates: 2019-2022
Total amount: €368,665

Title: **Creación de una unidad científica de la innovación empresarial en el INAM de la Universitat Jaume I**
**Acronym of the project: UCIE INAM**
Funding entity: Generalitat Valenciana
Modality: AGENCIA VALENCIANA DE LA INNOVACIO
Entity code: A11I - CONTRACTES ART 83 LOU
Principal researchers: Juan Bisquert
Dates: 2019-2020-2021
Total amount: €750,000

Title: **Sintesis de combustibles y valoración de aguas residuales a partir de energías renovables**
**Acronym of the project: IDIFEDER**
Funding entity: Generalitat Valenciana
Modality: Convocatoria de ayudas para infraestructura y equipamiento de I+D+I IDIFEDER 2018-2020
Entity code: IDIFEDER/2018/012
Principal researchers: Juan Bisquert
Dates: 2018-2020
Total amount: €577,792

Title: **Sistemas cuánticos para el desarrollo de dispositivos optoelectrónicos**
**Acronym of the project: Q-DEVICES**
Funding entity: Generalitat Valenciana
Modality: Programa PROMETEU
Entity code: PROMETEO/2018/098
Principal researchers: Iván Mora-Seró
Dates: 2018-2021
Total amount: €312,595

# LOCAL PROJECTS FROM UJI

Title: **Desarrollo de dispositivos fotoelectrocatalíticos avanzados para la conversión de CO2 en productos químicos de alto valor añadido**
**Acronym of the project: CO2VAL**
Funding entity: UJI
Modality: Pla Propi d'Investigació UJI - Modalitat B) Grups consolidats investigador individuals
Entity code: UJI-B2020-50
Principal researchers: Sixto Giménez
Dates: 2021-2023
Total amount: €20,000

Title: **Decoupling manufacturing from application: 3D-printable smart antimicrobial devices with nanoparticles activated on demand**
**Acronym of the project: Nano3D**
Funding entity: Universitat Jaume I. UJI
Modality: Convocatoria de Proyectos de Plan de Promoción de la Investigación UJI
Entity code: UJI-B2020-44
Principal researchers: Victor Sans Sangorrin
Dates: 2021-2022
Total amount: €20,000

Title: **Sistemas Organometálicos Supramoleculares. Aplicaciones en catàlisis y reconocimiento molecular**
Funding entity: Universitat Jaume I. UJI
Modality: Plan propio
Entity code: UJI-B2020-01
Principal researchers: Eduardo Peris
Dates: 2021-2023
Total amount: €31,888

Title: **Células Solares Orgánicas y Flexibles diseñadas para condiciones de baja iluminación**
**Acronym of the project: SOLARFLEX**
Funding entity: Universitat Jaume I
Modality: Pla de Promoció de la Investigació UJI
Entity code: UJI-B2020-49
Principal researchers: Antonio Guerrero
Dates: 2021-2023
Total amount: €26,000

Title: **GACUJI/2021/06 FABREGAT SANTIAGO, FRANCISCO**
Funding entity: Universitat Jaume I. UJI
Modality: PROGRAMA GRUPS D'INVESTIGACIO ACTIUS EN CAPTACIÓ DE RECURSOS PLA ESTATAL I+D+I CODI GRUP 034
Entity code: GACUJI/2021/06
Principal researchers: Francisco Fabregat-Santiago
Dates: 2021
Total amount: €12,440

Title: **Desarrollo de perovskitas bidimensionales (2D) para la mejora del transporte electrónico en dispositivos fotovoltaicos de alta estabilidad**
**Acronym of the project: DEPE2D**
Funding entity: Universitat Jaume I. UJI
Modality: Pla de Promoció de la Investigació UJI
Entity code: UJI-B2019-09
Principal researchers: Eva Mª Barea
Dates: 2020-2022
Total amount: €18,000

Title: **Desarrollo de rutas fotoelectrocatalíticas para la síntesis de productos de alto valor añadido**
**Acronym of the project: FOTOSIN**
Funding entity: Universitat Jaume I. UJI
Modality: Pla Propi d'Investigació UJI
Entity code: UJI-B2019-20
Principal researchers: Elena Mas Marzá
Dates: 2020-2022
Total amount: €24,000

Title: **Design of catalysts for the development of eficient energy storage systems based on liquid organic hydrogen carriers.**
**Acronym of the project: CatLOHCs**
Funding entity: Universitat Jaume I. UJI
Modality: Pla Propi d'Investigació UJI - Modalitat B) Grups consolidats i investigador individuals
Entity code: UJI-B2018-23
Principal researchers: Jose Mata
Dates: 2019-2021
Total amount: €22,000

Title: **New ENhanced Up-converting Photonic ARquitectures for advanced applications**
**Acronym of the project: NENUPhAR**
Funding entity: Universitat Jaume I
Modality: Ayudas para el fomento de la investigación científica
Entity code: B2018-71
Principal researchers: Beatriz Julian-Lopez
Dates: 2019-2021
Total amount: €15,882

Title: **Transformación de Energía Solar en Combustibles solares a partir de Perovskitas**
**Acronym of the project: TRESCOPE**
Funding entity: Universitat Jaume I
Modality: Programa de Fomento de proyectos de investigación
Entity code: UJI-B2017-32
Principal researchers: Antonio Guerrero
Dates: 2018-2020
Total amount: €29,122

Title: **Nanoestructuras metalo-orgánicas para catálisis y reconocimiento molecular**
**Acronym of the project: SUPRACAT**
Funding entity: Universitat Jaume I
Modality: Pla Propi
Entity code: UJI-B2017-07
Principal researchers: Eduardo Peris
Dates: 2018-2020
Total amount: €40,000

# CONTRACTS WITH COMPANIES

Title: **Producción industrial de syngas a partir de electroreducción de CO2**
Funding entity: Blueplasma Power SL
Modality: Art. 83 LOU
UJI accounting code: 21I248
Principal researchers: Francisco Fabregat-Santiago
Dates: 2021-2022
Total amount: €20,000

Title: **H2B2 ELECTROLYSIS TECHNOLOGIES**
Funding entity: H2B2
Modality: A11I - CONTRACTES ART 83 LOU
Entity code: 8923/2020
Principal researchers: Sixto Giménez
Dates: 2020-2021
Total amount: €24,000

Title: **Contrato de evaluación de tecnología y opción de licencia de patente**
**Acronym of the project: KERATOUC**H
Funding entity: Keraben SL
Modality: A11I - CONTRACTES ART 83 LOU
Entity code: 212/2021
Principal researchers: Francisco Fabregat-Santiago
Dates: 2021
Total amount: €24,778

Title: **Estudio de materiales y recubrimientos avanzados para el enfriamiento de edificios**
**Acronym of the project: RADIAKER**
Funding entity: KERABEN
Modality: A11I - CONTRACTES ART 83 LOU
Entity code: 26599
Principal researchers: Juan Bisquert
Dates: 2019-2020
Total amount: €16,500

# FUNDING ENTITIES

GOBIERNO DE ESPAÑA
MINISTERIO DE EDUCACIÓN, CULTURA Y DEPORTE

GENERALITAT VALENCIANA
Conselleria de Innovación, Universidades, Ciencia y Sociedad Digital
TOTS A UNA veu

erc

GENERALITAT VALENCIANA

AVI AGÈNCIA VALENCIANA DE LA INNOVACIÓ

UNIÓ EUROPEA
Fons Europeu de Desenvolupament Regional
Una manera de fer Europa

UNIVERSITAT JAUME I

inam
Institute of Advanced Materials
UJI Castelló