

## Part A. PERSONAL INFORMATION

CV date	30/03/2023
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First name	Edgar		
Family name	Ventosa		
Gender	Male	Birth date	
Social Security, Passport, ID number			
e-mail	eventosa@ubu.es	URL Web:	<a href="https://investigacion.ubu.es/grupos/7652/detalle">https://investigacion.ubu.es/grupos/7652/detalle</a>
Open Researcher and Contributor ID (ORCID)	0000-0002-8993-4285		

### A.1. Current position

Position	Personal Docente Investigador (Ramón y Cajal contract)		
Initial date	01/05/2020		
Institution	University of Burgos		
Department/Center	Department of Chemistry		
Country	Spain	Teleph. number	
Key words	Electrochemistry, energy storage, batteries, green hydrogen production		

### A.2. Previous positions (research activity interruptions, art. 14.2.b))

Period	Position/Institution/Country/Interruption cause
03/2017 – 04/2020	Senior researcher at IMDEA Energy (Spain)
01/2015 – 02/2017	Senior researcher at Ruhr-University-Bochum (Germany)
11/2013 – 01/2015	Post-doc researcher at Catalonia Institute for Energy Research (Spain)
03/2012 – 11/2013	Post-doc researcher at Ruhr-University-Bochum (Germany)
07/2011 – 02/2012	Project manager at Technology Center Miranda de Ebro (Spain)
09/2009 – 06/2011	Post-doc researcher at Ruhr-University-Bochum (Germany)

### A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Chemistry	University of Burgos	2009
Licensed in Chemistry	University of Burgos	2004

## Part B. CV SUMMARY (max. 5000 characters, including spaces)

Dr. Edgar Ventosa joined the University of Burgos (Spain) in **May 2020** as Ramon y Cajal researcher **establishing a new research group** (the ProElectro group). Before that, he has held several positions at various organizations (IMDEA Energy, Ruhr University-Bochum, Catalonia Institute for Energy Research and Technology Center Miranda de Ebro) accumulating **over 6 years abroad** since he obtained his PhD in Chemistry at the University of Burgos (2009) and creating an extensive network of international collaborators (150+ coauthors (96 from abroad) in his publications).

During his scientific career, Dr. Ventosa has participated as partner or PI in 20+ projects leading to 90+ articles in peer-reviewed journals. Dr. Ventosa has been ranked among **the top 2% more influential scientist in 2021** by the Ranking of World Scientists elaborated by the Stanford University. **In the last 5 years**, Dr. Edgar Ventosa has secured, **as PI, 1.5+ Million Euros** in public funding (Region, National and European level) and private contracts, including a **Horizon Europe EIC pathfinder-open (2.5+ million euro)** in which Dr. Ventosa is the **coordinator**. This funding has allowed the generation of cutting-edge knowledge in the battery field resulting in **5 International patent applications** (some licensed or held by companies



with which Dr. Ventosa regularly collaborates) as well as **30+ publications in peer-reviewed journal** (30+ as corresponding author) **in the last 5 years** (70+ papers in the last 10 years). **As corresponding author**, Dr. Ventosa, has published 50 articles in high-ranked journals of his field, e.g. 2 *Angew. Chem.*, 2 *Adv. Energy Mater.*, 1 *Adv. Sci.*, 2 *Nano Energy*, 6 *Chem. Comm.*, 1 *J. Mater. Chem. A*, etc. The excellency of his scientific and technological contributions has led to several awards/grants such as Talent attraction from Comunidad de Madrid, Torres Quevedo and Ramón y Cajal from Spanish Ministry.

**Dr. Edgar Ventosa** has an extensive background in electrochemistry and, particularly, in **battery research** covering several disciplines, e.g. battery electrochemistry, battery materials, battery analytics, battery prototyping, and several battery technologies, e.g. Li-ion, Na-ion, Ni-MH, Zn-Air, Redox Flow Batteries. Overall, Dr. Ventosa is well recognized by his contributions to i) establishment of **analytical tools for battery** research, ii) progress in **redox-flow batteries**, and iii) development of **disruptive battery concepts**, specially related to technology concepts based on semi-solid electrodes and redox-mediated flow batteries.

He regularly delivers **talks at international conferences** and workshops (1.5+ per year in the last 10 years), and acts **as referee for funding agencies**, e.g. member of expert panel of Spanish State Agency for Research, or remote referee for several agencies, **book proposals**, e.g. Imperial College Press, **and peer-reviewed journals**, e.g. *Chem. Rev. Soc.*, *Adv. Mater.*, *Nat. Commun.*, *JACS*, *Angew. Chem.*, *Chem. Sci.*, *Energy Environ. Sci.*.

Since 2022, Dr. Ventosa serves as **technical manager for the Materials Division of the Spanish Agency of Research**.

## Part C. RELEVANT MERITS (sorted by typology)

### C.1. Publications (see instructions)

1. R. Rubio-Presa, L. Lubian, M. Borlaf, E. Ventosa, R. Sanz, **ACS Materials Letter**, 5 (2023) 798-802 (IF=11.2) (4/5)
2. T. Páez, F. Zhang, M.A. Muñoz, L. Lubian, S. Xi, R. Sanz, Q. Wang, J. Palma, **E. Ventosa\***. "The Redox-Mediated Nickel–Metal Hydride Flow Battery", **Adv. Energy Mater.** 12 (2022) 2102866 (IF=29) (9/9)
3. C.S. Santos, A. Botz, A.S. Bandarenka, **E. Ventosa\***, W. Schuhmann\*, "Correlative Electrochemical Microscopy for the Elucidation of the Local Ionic and Electronic Properties of the Solid Electrolyte Interphase in Li-Ion Batteries" **Angew. Chem. In. Ed.** 61 (2022) e202202744 (IF=16.8) (4/5)
4. E. Garcia-Quismondo, S. Alvarez-Conde, G. Garcia, J.I. Medina-Santos, J. Palma, **E. Ventosa\***, "Technique for Probing the Protecting Character of the Solid Electrolyte Interphase as a Critical but Elusive Property for Pursuing Long Cycle Life Lithium-Ion Batteries", **ACS Applied Materials & Interfaces** 14 (2022), 43319-43327 (IF=10.4) (6/6)
5. T. Löffler, J. Clausmeyer, P. Wilde, K. Tschulik, W. Schuhmann,\* **E. Ventosa\*** "Single entity electrochemistry for the elucidation of lithiation kinetics of TiO<sub>2</sub> particles in non-aqueous batteries", **Nano Energy**, 57 (2019) 827-834 (IF=15.5) (6/6)
6. S. Barwe, B. Mei, J. Masa, W. Schuhmann,\* **E. Ventosa\*** "Overcoming cathode poisoning from electrolyte impurities in alkaline electrolysis by means of self-healing electrocatalyst films" **Nano Energy** 53 (2018) 763-768 (IF=15.5) (5/5)
7. G. García, S. Dieckhöfer, W. Schuhmann,\* **E. Ventosa\*** "Exceeding 6500 cycles for LiFePO<sub>4</sub>/Li metal batteries through understanding pulsed charging protocols" **J. Mater. Chem. A** 6 (2018) 4746-4751 (IF=10.7) (4/4)
8. S. Barwe, J. Masa, C. Andronesco, B. Mei, W. Schuhmann,\* **E. Ventosa\*** "Overcoming the Instability of Nanoparticle-Based Catalyst Films in Alkaline Electrolyzers by using Self-Assembling and Self-Healing Films" **Angew. Chem. In. Ed.** 56 (2017) 8573-8577 (IF=12) (6/6)
9. **E. Ventosa\***, B. Paulitsch, P. Marzak, J. Yun, F. Schiegg, T. Quast, A.S. Bandarenka,\* "The Mechanism of the Interfacial Charge and Mass Transfer during Intercalation of Alkali Metal Cations" **Adv. Sci.** 3 (2016) 1600211 (IF=15.5) (1/7)



10. E. Madej, F. La Mantia, W. Schuhmann, **E. Ventosa**\* “Impact of the Specific Surface Area on the Memory Effect in Li-Ion Batteries: The Case of Anatase TiO<sub>2</sub>” ***Adv. Energy Mater*** 4 (2014) 1400829 (IF=25) (4/4)

### **C.2. Congress (only oral contributions to international events)**

1. “The Ni- The Redox-Mediated Nickel–Metal Hydride Flow Battery” (Invited), **E. Ventosa**, T. Páez, F. Zhang, M.A. Muñoz, L. Lubian, S. Xi, R. Sanz, Q. Wang, J. Palma. The 241<sup>st</sup> ECS Meeting, May 2022, Vancouver, Canada
2. “Towards High-energy Alkaline Flow Batteries by Enabling Charge Storage in Solid Materials” **E. Ventosa**, T. Páez, J. Palma, 70th Annual Meeting of the International Society of Electrochemistry, August 2019, Durban (South Africa)
3. “Merging flow and non-flow batteries: K<sub>4</sub>Fe(CN)<sub>6</sub> electrolyte – Ni(OH)<sub>2</sub> solid material as proof of concept” **E. Ventosa**, T. Páez, J. Palma, Electrochemical Conference on Energy and the Environment: Bioelectrochemistry and Energy Storage, July 2019, Glasgow (UK)
4. “Injectable batteries based on semi-solid electrodes: a concept for increased sustainability” **E. Ventosa**, D. Pérez, J. Palma, The 4th International Forum on Progress and Trends in Battery and Capacitor Technologies, July 2019, Vitoria (Spain)
5. “Scanning electrochemical microscopy: an emerging in-operando technique for battery materials” (Invited) **E. Ventosa**, W. Schuhmann. Heräus Seminar “In-operando Characterisation of Energy Materials”, August 2017 in Bonn (Germany)
6. “Challenge of the separator in non-aqueous flow batteries. Are semi-solid electrodes a possible way to go?” **E. Ventosa**, E. García – Quismondo, R. Marcilla, W. Schuhmann, C. Flox, J. Ramon Morante, J. Palma. The 4th International Forum on Progress and Trends in Battery and Capacitor Technologies, July 2017 in Vitoria (Spain)
7. “Size does matter in Li-ion battery materials: the case of the memory effect”. **E. Ventosa**, Edyta Madej, Tobias Löffler, Fabio La Mantia, Wolfgang Schuhmann. ElecNano VII, May 2016 in Lille (France)
8. “Semi-solid flow battery: an emerging electrochemical system” **E. Ventosa**, C. Flox, J. Ramon Morante, W. Schuhmann. 66<sup>th</sup> Annual meeting of International Society of Electrochemistry, October 2015 in Taipei (Taiwan)
9. “Beyond Li-ion batteries” (Invited) **E. Ventosa**. ExpoElectric – Formula-e 2014, October 2014 in Barcelona (Spain)
10. “Strategies to improve the performance of TiO<sub>2</sub> as negative electrode material” **E. Ventosa**, W. Xia, P. Chen, B. Mei, M. Muhler, W. Schuhmann. 64<sup>th</sup> Annual meeting of International Society of Electrochemistry, September 2013 in Santiago de Queretaro (Mexico).

### **C.3. Research projects (only as PI)**

1. “Converting Facilities Network for accelerating uptake of climate neutral materials in innovative products (101092347)” Horizon Europe, Open Innovation Test Bed Call, **PI: Edgar Ventosa**. Amount for UBU: 750.000,00 €. Dates: 1/01/2023 – 31/12/2025
2. “Shape-free, easily-recyclable batteries based on gellable injectable electrodes (TED2021-131651B-C21)” Ministry of Science and Innovation. Ecological and Digital Transition Call. **PI: Edgar Ventosa**. Amount: 166.175,00 €. Dates: 1/12/2022 – 30/11/2024
3. “Advanced Materials, University of Burgos: ProElectro (NextGenerationEU / PRTR)” Junta de Castilla y León. Complementary Plan for R&D&i Call. **PI: Edgar Ventosa**. Amount: 179.251,00 €. Dates: 1/01/2022 – 31/08/2025
4. “Fundamentals and application of an all-Organic Mediated flow BATtery (PID2021-124974OB-C22)”. Ministry of Science and Innovation. Knowledge Generation Call. **PI: Edgar Ventosa**. Amount: 157.300,00 €. Dates: 1/09/2022 – 31/08/2025
5. “Mediated Biphasic Flow Battery – MeBattery (101046742)”. Horizon Europe – European Commission. European Innovation Council (EIC) Pathfinder Open 2021. **Coordinator: Edgar**



**Ventosa.** Total Amount: 2.508.694,00 € (Amount for UBU: 544.313,00 €). Dates: 01/05/2022 – 30/04/2025

6. “Advanced Batteries for Mobile Healthcare Monitoring Device – Battery4Health (LCF/PR/PR18/51130007)”. Fundacion La Caixa – Caja Burgos. **PI: Edgar Ventosa.** Amount: 80.000,00 €. Dates: 1/12/2020 – 30/11/2022

7. “GHz nanoscale electrical and dielectric measurements of the solid-electrolyte interphase and applications in the battery manufacturing line – NanoBat (861962)”. Horizon 2020 – European Commission. NMBP-TO-IND-2018-2020 / DT-NMBP-08-2019. **PI: Edgar Ventosa** (as PI of IMDEA Energy). Amount: 381.875,00 € (IMDEA Energy). Trasfered to UBU: 190.937,50 €. Dates: 1/04/2020 – 31/03/2023

8. “Ramón y Cajal (RYC2018-026086-I)”. Spanish Ministry of Economy, Industry and Competitiveness. **PI: Edgar Ventosa.** Amount: 208.600,00 €. Dates: 1/05/2020 – 30/04/2025

9. “Injectable batteries (RTI2018-099228-A-I00)”. Research Challenges, Spanish Ministry of Science, Innovation and Universities. **PI: Edgar Ventosa.** Amount: 121.000,00 €. Dates: 1/01/2019 – 31/12/2021

10. “Batteries based on semi-solid fluids (2017-T1/AMB-5190)”. Regional Government of Comunidad de Madrid. **PI: Edgar Ventosa.** Amount: 307.076,00 €. Dates: 1/03/2018 – 28/02/2022

#### **C.4. Contracts, technological or transfer merits (only as PI)**

1. “Investigación de nuevos electrolitos orgánicos derivados de fenacina y viológeno para baterías”. Direct contract with B5Tech. **PI: Edgar Ventosa** and Roberto Sanz. Amount: 50.000,00 €. Dates: 08/06/2021 – 31/12/2021.

2. “Preparación de derivados de fenacina.”. Direct contract with IMDEA Energy. **PI: Edgar Ventosa** and Roberto Sanz. Amount: 7.000,00 €. Dates: 26/11/2019 – 31/12/2019

3. “Evaluation of Li Plating in battery cells at high C-rates”. Direct contract with Kreisel Electric. **PI: Edgar Ventosa.** Amount: 1.400,00 €. Dates: 1/07/2019 – 31/12/2019

4. J. Lado, **E. Ventosa**, D. Perez-Antolin, E. García-Quismondo, J. Palma, “*Recyclable Electrodes*”, European patent application (**PCT/EP2020/073842**). Holder: IMDEA Energy. Priority date: 31/08/2020

5. I. Montes, R. Marcilla, J. Palma, **E. Ventosa**, M. Vera, M. Sanchez “*Redox Flow Battery with immiscible electrolyte and flow through electrode*”, International patent application (**WO2021209585A1**). Holder: IMDEA Energy. Priority date: 16/04/2020

6. **E. Ventosa**, D. Pérez, G. García, J. Palma “*An alkaline flow battery assembly*”, International patent application (**WO2020245478A1**). Holder: Energy Storage Solutions. Priority date: 06/06/2019. [Held by the company Energy Storage Solutions \(E22\)](#)

7. **E. Ventosa**, T. Paez, J. Palma “*Redox Flow Battery for energy storage*” International patent application (**WO2020127661A1**). Holder: IMDEA Energy. Priority date: 21/12/2018. [Licensed to the company B5Tech.](#)

8. **E. Ventosa**, S. Barwe, W. Schuhmann, J. Masa, C. Andronescu, “*Self-assembling and self-healing nanoparticle-based catalyst films for alkaline electrolyzers*” International patent application (**WO2018127536**). Holder: Ruhr-University-Bochum. Priority date: 06/01/2017

9. R. Sanz, R. Rubio-Presa, **E. Ventosa**, L. Lubian, “*Viológeno de 3-butilsulfonato, su procedimiento de obtención y utilización del mismo*” Spanish Patente Application (**P202230676**) Holder: University of Burgos. Priority date: 22/07/2022