

CURRICULUM VITAE ABREVIADO (CVA)

Part A. PERSONAL INFORMATION

First name	Joaquin		
Family name	Ramirez Rico		
Gender (*)		Birth date	
ID number			
e-mail		URL Web	
Open Researcher and Contributor ID (ORCID) (*)		0000-0002-1184-0756	

A.1. Current position

Position	Full professor (<i>Catedrático</i>)		
Initial date	2022		
Institution	University of Seville		
Department/Center	Condensed Matter Physics - School of Physics		
Country	Spain	Phone number	
Keywords	Physics, Materials Science, Advanced Ceramics, Functional Materials, Carbon, Batteries, Supercapacitors		

A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
2022-today	Full Professor (<i>Catedrático</i>), University of Seville, Spain
2018-2022	Associate Professor (<i>Titular</i>), University of Seville, Spain
2012-2018	Assistant Professor (<i>Contratado Doctor</i>), University of Seville, Spain
2010-2012	Lecturer (<i>Ayudante Doctor</i>), University of Seville, Spain
2009-2010	Postdoctoral Researcher, Northwestern University, USA
2004-2008	Graduate student and Ph.D. candidate, University of Seville, Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Bachelor in physics	University of Sevilla - Spain	2003
Master in Materials Science	University of Sevilla - Spain	2007
PhD in Materials Science	University of Sevilla - Spain	2008

Part B. CV SUMMARY

I am a Full Professor (*Catedrático*) in the Department of Condensed Matter Physics at the University of Seville and a researcher at the Materials Science Institute of Seville (ICMS, a joint University of Seville-CSIC research institute). Since 2019, I have led the Biomimetic and Multifunctional Materials Research Group (FQM342), coordinating multidisciplinary efforts in advanced materials science. My research career is characterized by a strategic evolution from structural ceramics to functional materials for energy transition. While my early work and PhD focused on the micromechanics of eutectic ceramics and advanced characterization at large facilities (Argonne National Lab, USA), followed by a postdoctoral tenure at Northwestern University dealing with stress analysis in complex composites, my current focus addresses critical challenges in sustainable energy.

Since 2012, I have pioneered lines of research on biomass-derived carbon materials for high-impact applications, including supercapacitors, capacitive desalination, and Li-ion/Na-ion battery anodes. This work is conducted in collaboration with leading international centers such as the Münster Electrochemical Energy Technology Institute and the University of Birmingham. I also maintain active research on high-temperature proton conductors for SOFC/electrolyzers and porous biomorphic SiC for environmental filtration.

In the realm of technology transfer, teaching and research management, have been PI for an industrial contract with ALFRAN within the framework of the INTERCONNECTA call (CDTI) and have published two patents on applications of porous materials. Since 2016, I have served as the Scientific Director of the General Research Service 'X-ray Laboratory' at the University of Seville, managing a team of six permanent technicians and overseeing high-value instrumentation infrastructure. My ability to secure resources is demonstrated by a track record of over €5.5 million in funding secured as Principal Investigator (PI), combining competitive research grants and infrastructure projects. I also served as coordinator for the Materials Science MSc program for a three-year period (2013-2016).

I have three recognized 6-year research periods (sexenios): 2004-2009, 2010-2015 y 2016-2021, supervised four PhD theses in the last 10 years. I have received 2930 total citations and 1815 citations in the 2021-2025 period (369 citations/year), h-Index = 32 (source: Google Scholar) / 2318 total citations and 1404 citations in the 2021-2025 period (281 citations/year), h-Index = 28 (source: Scopus). I am the author or co-author of 95 indexed papers (Scopus).

Part C. RELEVANT MERITS

C.1. Publications

1. Scientific paper. Hayward, E. C., Takeguchi, M., Lloyd, H. J., Stratford, J. M., Smith, A. J., Snow, T., ... **Ramírez-Rico, J (7/8)** & Schnepf, Z. (2025). In situ TEM and synchrotron SAXS/WAXS study on the impact of different iron salts on iron-catalysed graphitization of cellulose. *Journal of Materials Chemistry A*, 13(32), 26327-26336.
2. Scientific paper. Hunter, Robert D.; Takeguchi, Masaki; Hashimoto, Ayako; ... (10/11) **Ramírez-Rico, Joaquín (AC)** & Schnepf, Zoe. 2024. Elucidating the Mechanism of Iron-Catalyzed Graphitization: The First Observation of Homogeneous Solid-State Catalysis. *Advanced Materials* 36, 2404170.
3. Scientific paper. Fernández-Muñoz, Sol; Alba, María D.; Chacartegui, Ricardo; (4/4) **Ramírez-Rico, Joaquín (AC)**. 2024. Optimising anode supported $\text{BaZr}_{1-x}\text{Y}_x\text{O}_{3-\delta}$ electrolytes for solid oxide fuel cells: Microstructure, phase evolution and residual stresses analysis. *Journal of Power Sources*. 596, pp. 234070.
4. Scientific paper. Gómez-Martín, Aurora; Schnepf, Zoe; (3/3) **Ramírez-Rico, Joaquín (AC)**. 2021. Structural evolution in iron-catalyzed graphitization of hard carbons. *Chemistry of Materials*. 33-9, pp.3087-3097.
5. Scientific paper. Gomez-Martin, A.; Martinez-Fernandez, J.; Ruttart, Mirco; Winter, Martin; Placke, Tobias; (6/6) **Ramírez-Rico, J.** 2020. An electrochemical evaluation of nitrogen-doped carbons as anodes for lithium ion batteries. *Carbon* 164, pp.261-271.
6. Scientific paper. Gomez-Martin, Aurora; Martinez-Fernandez, Julian; Ruttart, Mirco; Winter, Martin; Placke, Tobias; (6/6) **Ramírez-Rico, Joaquín (AC)**. 2019. Correlation of Structure and Performance of Hard Carbons as Anodes for Sodium Ion Batteries. *Chemistry of Materials*. 31-18,
7. Scientific paper. Gomez-Martin, Aurora; Martinez-Fernandez, Julian; Ruttart, Mirco; Heckmann, Andreas; Winter, Martin; Placke, Tobias; (7/7) **Ramírez-Rico, Joaquín (AC)**. 2018. Iron-Catalyzed Graphitic Carbon Materials from Biomass Resources as Anodes for Lithium-Ion Batteries. *ChemSusChem* 11-16, pp.2776-2787.
8. Scientific paper. Gómez-Martín, A.; Orihuela, M. P.; Becerra, J. A.; Martínez-Fernández, J.; (5/5) **Ramírez-Rico, J. (AC)**. 2016. Permeability and mechanical integrity of porous biomorphic SiC ceramics for application as hot-gas filters. *Materials & Design* 107, pp.450-460.
9. Scientific paper. Gutiérrez-Pardo, A.; (2/4) **Ramírez-Rico, J. (AC)**; Cabezas-Rodríguez, R.; Martínez-Fernández, J. 2015. Effect of catalytic graphitization on the electrochemical behavior of wood derived carbons for use in supercapacitors. *Journal of Power Sources* 278-15, pp.18-26.

10. Review paper. Hunter, R. D.; (2/3) **Ramírez-Rico, J.**; Schnepf, Z. 2022. Iron-catalyzed graphitization for the synthesis of nanostructured graphitic carbons. Journal of Materials Chemistry A 10-9, pp.4489-4516.

C.2. Conferences

1. Invited talk: **J. Ramírez-Rico**, Z. Schnepf, A. Gómez-Martín. Biomass-derived carbon materials: understanding the correlation between atomic structure and electrochemical properties using in-situ techniques, in Brazilian-MRS Meeting, Sep 29-Oct 3, Santos, Brazil.
2. Invited talk: **J. Ramírez-Rico**. Biomass and wood derived materials for structural and energy applications, in ACerS Panamerican Ceramic Congress, Jul 24-28 2022. Panama City, Panama.
3. Invited talk: **J. Ramírez-Rico**, J. Martínez-Fernández, M. P. Orihuela, A. Gómez-Martín, R. Chacartegui, J. A. Becerra, P. Miceli, and D. Fino. Ceria-based catalytic regeneration of wall-flow Diesel Particulate Filters made of biomorphic Silicon Carbide, in 42nd International Conference and Expo on Advanced Ceramics and Composites. 2018. Daytona Beach, FL, EEUU: The American Ceramic Society.
4. Invited talk: **J. Martínez-Fernández**, J. Ramírez-Rico, F. M. Varela-Feria, C. Vera-García, A. Gutiérrez-Pardo, Bio-inspired Ceramic Composites for Engineering Applications, 36th International Conference & Exposition on Advanced Ceramics & Composites, Daytona Beach, FL, USA. American Ceramic Society 2012.
5. Invited talk: **J. Ramírez-Rico**, J. M. Fernández, M. Singh, Environmentally Conscious SiC Ceramics Obtained from Natural Precursors: Recent Developments and Challenges, 3rd International Congress on Ceramics, Osaka, Japan, 2010.

C.3. Research projects

1. Project: “Hierarchically Porous Architected Carbon materials for Energy applications (Hi-PACE)”, 2025-2028, Ministerio de Ciencia, Innovación y Universidades PID2024-159849NB-I00, 150.000,00€. IP1: **Joaquín Ramírez Rico**, IP2: João Carlos Mesquita Coelho.
2. Project: “Biomorphic materials for energy storage (BioMatStor)”, 2021-23, Consejería de Economía, Conocimiento, Empresas y Universidad, Junta de Andalucía, PAIDI: Proyectos I+D+i. P20/01186, 106.550,00 €. IP: **Joaquín Ramírez Rico**
3. Project: “Biomass for DEsalination via CAPacitive Deionization and Energy Storage, (BioDECADES)” 2022, Consejería de Economía, Conocimiento, Empresas y Universidad, Junta de Andalucía. Programa FEDER Andalucía 2014-2020 US-1380856, 80.000,00 €. IP: **Joaquín Ramírez Rico**.
4. Project: “Cerámicas Conductoras de Protones para Electrolizadores Reversibles de Alta Eficiencia y Aplicaciones Power to X”, 2020-23, Ministerio de Ciencia, Innovación y Universidades, PID2019-107019RB-I00, 72.600,00€. IP1: **Joaquín Ramírez Rico**, IP2: Ricardo Chacartegui Ramírez.
5. Project: “Nuevo concepto de caldera de biomasa basada en materiales biocerámicos y combustión porosa para operación eficiente con residuos”, 2017-2019. Ministerio de Economía y Competitividad, MAT2016-76526-R, 60.500,00 €. IP1: **Joaquín Ramírez Rico**, IP2: Ricardo Chacartegui Ramírez.
6. Project: “SOLar Calcium-looping integRation for Thermo-Chemical Energy Storage (SOCRATCES)”, 2018-2020, Research and Innovation Action H2020, Comisión Europea, PRJ201703228. 401,250.00 € (parte correspondiente a la Universidad de Sevilla). IP: Ricardo Chacartegui Ramírez.
7. Project: “Filtros bio-cerámicos para partículas en motores diésel”. 2014-2016. Ministerio de Economía y Competitividad, MAT2013-41233-R, 197.551,02 €. IP1: Julián Martínez Fernández, IP2: Ricardo Chacartegui Ramírez.

8. Project: “BIOENER: Aplicación de tecnologías biomiméticas en sistemas energéticos”. 2010-2013. Consejería de Innovación, Ciencia y Empresa de la Junta de Andalucía, proyecto motriz (311.167,68€) P09-TEP-5152. IP: Julián Martínez Fernández
9. Project: “Aplicación de una nueva generación de materiales cerámicos bioderivados a procesos industriales de filtración a altas temperatura y presión” (BIOFIL). 2008-2009. MCEI, CIT-120000-2008-16 241.530 € (125.720 € correspondientes a la Univ. De Sevilla). IP: Julián Martínez Fernández
10. Project: “FILGAS: Mejora Tecnológica de la Filtración de Gas de Síntesis en Procesos de Gasificación a Alta Temperatura y Presión”. 2007.2008. Ministerio de Medioambiente, Proyectos Medioambientales de Investigación Científica A516/2007/3 (124.530 €). IP: Julián Martínez Fernández
11. “New Bio-ceramization processes applied to vegetable hierarchical structures”. 2006-2010. Specific Targeted Research Projects STRP 033277 TEM-PLANT (VII Programa Marco UE). 314.000 €. IP: Julián Martínez Fernández (Univ. de Sevilla).

C.4. Contracts, technological or transfer merits

1. Infrastructure project: “Difractómetro de rayos X de alta resolución con cuna de Euler y detector bidimensional para microdifracción, análisis de texturas y tensiones residuales”, 2025, Ministerio de Ciencia, Innovación y Universidades, EQC2025-009323-P, 930.941,33€. IP: **Joaquín Ramírez Rico**
2. Infrastructure project: “Haz de luz para laboratorio SAXS/WAXS para medidas in-situ/in-operando en la nanoescala”, 2024, Ministerio de Ciencia, Innovación y Universidades, EQC2024- 007934-P, 1.012.590€. IP: **Joaquín Ramírez Rico**
3. Infrastructure project: “Instrumento de tomografía axial computarizada de altas prestaciones con tubo de alta energía”, 2024, Ministerio de Ciencia, Innovación y Universidades, EQC2024- 008566-P, 1.019.546€. IP: **Joaquín Ramírez Rico**
4. Infrastructure project: “Instrumento versátil de nanotomografía axial computarizada”, 2018-2019. Ministerio de Ciencia, Innovación y Universidades, EQC2018-004027-P, 800.000,00€. IP: **Joaquín Ramírez Rico**
5. Infrastructure project: “Actualización y mejora de las capacidades en difracción y fluorescencia de rayos X de los Servicios Generales de Investigación”, 2019-20. Ministerio de Ciencia, Innovación y Universidades, EQC2019-005577-P. 420.659,00€ IP: **Joaquín Ramírez Rico**
6. Infrastructure project: “Equipo portátil de fluorescencia de rayos x con capacidad de mapeo de área”, 2019-20. Ministerio de Ciencia, Innovación y Universidades, EQC2019-005579-P. 135.700,00 € IP: **Joaquín Ramírez Rico**
7. Research contract: “Materiales Vítreos Cementantes de Alta Eficiencia Energética y Bajo Impacto Ambiental (MAVIT)”. 2012-2015. Contract with Alfran Refractarios, S. L. 120.000 €. IP: **J. Ramírez-Rico**.
8. Patent: A. Tampieri, S. Sprio, A. Ruffini, J. Will, P. Greil, F. Mueller, J. Martínez-Fernández, C. Torres-Raya, F. M. Varela-Feria, **J. Ramírez-Rico** & M. F. Harmand. “Implants for 'load bearing' bone substitutions having hierarchical organized architecture deriving from transformation of vegetal structures”. MI2010A002070, Italy, 2010
9. Patent: J. Martínez-Fernández, R. Chacartegui, **J. Ramírez-Rico**, J. A. Becerra-Villanueva, M. P. Orihuela, A. Gómez-Martín. “Filtro para partículas de motores Diesel utilizando carburo de silicio biomórfico”. ES2759498A1, Spain, 2020.