

CURRICULUM VITAE ABREVIADO (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION

First name	Álvaro		
Family name	Colina Santamaría		
Gender (*)	Male	Birth date (dd/mm/yyyy)	
Social Security, Passport, ID number			
e-mail	https://investigacion.ubu.es/investigadores/35071/detalle		
Open Researcher and Contributor ID (ORCID) (*)	0000-0003-0339-356X		

(*) Mandatory

A.1. Current position

Position	Professor of Analytical Chemistry		
Initial date	6/10/2021		
Institution	Universidad de Burgos		
Department/Center	Department of Chemistry	Faculty of Science	
Country	Spain	Teleph. number	
Key words	Spectroelectrochemistry, Electrochemistry, Spectroscopy, UV/Vis absorption, Raman, photoluminescence, nanomaterials		

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

Period	Position/Institution/Country/Interruption cause
1996-207	Profesor Asociado/Universidad de Burgos
2007-2009	Profesor Contratado Doctor Fijo/Universidad de Burgos
2009-2021	Profesor Titular de Universidad/Universidad de Burgos

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Bachelor in Chemistry	Universidad de Valladolid	1994

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

Bsc from the University of Valladolid and PhD from the University of Burgos (UBU). FPU Scholar in 1995. Full-time Profesor Asociado in 1996. Since then I have been working at the UBU, being Professor in 2021 (4 research periods and 1 of transference). I also carried out management tasks. I was Vice Dean of the Faculty of Sciences (2012-2016), coordinator of the Master in Advanced Chemistry (2012-2016) and coordinator of the Doctorate in Advanced Chemistry of the UBU (2012-2020). I stayed in Prof. Unwin's group at the University of Warwick (UK) in 2006. My research has been focused on Spectroelectrochemistry (SEC) since 1994 when I started working with Prof. Jesús López-Palacios, when he created the Instrumental Analysis group. Currently, I am the leader of the *Instrumental Analysis group* (<https://investigacion.ubu.es/grupos/1762/detalle>). Our group is at the forefront of the



development of SEC techniques and devices. The big difference with other groups that uses SEC is that we always use this technique with high temporal resolution. We have developed Bidimensional SEC, Three-dimensional SEC, SEC at L/L interfaces, Bipolar SEC, Spatial Scanning SEC, SEC in screen-printed electrodes, low-resolution Raman SEC, time-resolved Raman SEC, simultaneous Raman and UV/Vis SEC, simultaneous Raman and photoluminescence SEC, simultaneous SECM and UV/Vis SEC. Usually, these techniques have been designed to solve problems of our collaborators. We have transferred our technology to commercial companies in order to facilitate the use of the SEC by other researchers. As a culmination of 20 years of work in SEC, in 2014 we developed in collaboration with Metrohm Dropsens S.L. the first worldwide commercial compact and integrated SEC UV/Vis instrument, and during the year 2017 we developed the first worldwide compact commercial SEC Raman instrument. In 2018 we discovered EC-SOERS, a phenomenon of amplification of the Raman signal during the electrochemical oxidation of silver. We collaborate with high level national and international groups. Since our beginnings, we have been growing with the intention of having a well-grounded internal structure and collaborators that allow us to grow up in quality to reach a high position in national and international Electrochemistry. Our techniques have been used successfully in the study of very different chemical systems such as complexes, conductive polymers, metallic nanoparticles, carbon nanotubes, graphene, hybrid materials, molecules of biological interest, etc. SEC has reached a state of maturity that will promote its use in the study of many chemical systems and will be a common tool in many laboratories. Our group prioritizes the quality of publications over quantity and we hope to continue improving the impact of our publications. Author of 105 articles in JCR, most of them in high quality journals. We receive a good number of citations and our position in our field (SEC and EC-SERS) is very high. We expect that being SEC commercially available, our impact in the scientific community will increase. We participate in a scientific network entitled "Red de sensores y biosensores electroquímicos" since 2018 until today. CIDETEC award 2015 for Scientific Research in Electrochemistry. I have supervised 10 PhD Thesis. Dr. Garoz received the 2018 award for the best thesis in Electrochemistry in Spain. I am supervising 3 Ph D students. Advisory Editorial Board of Microchemical Journal and ACS Electrochemistry. Invited professor in 2024 at the Université Paris-Saclay, Paris, France. I was International Society of Electrochemistry Regional Representative of Spain, reviewer of a number of journals and evaluator of projects for the AEI and other international agencies.

Part C. RELEVANT MERITS

C.1. Publications

1. Perez-Estebanez, M.; Perales-Rondon, J. V.; Hernandez, S.; Heras, A.; Colina, A. Bidimensional Spectroelectrochemistry with Tunable Thin-Layer Thickness. **ANALYTICAL CHEMISTRY** (2024), 96, 9927–9934.
2. Moldovan, R.; Perez-Estebanez, M.; Heras, A.; Bodoki, E.; Colina, A. Activating the SERS Features of Screen-Printed Electrodes with Thiocyanate for Sensitive and Robust EC-SERS Analysis. **SENSORS ACTUATORS B CHEM.** (2024) 135468.
3. Brosseau, C. L.; Colina, A.; Perales-Rondon, J. V.; Wilson, A. J.; Joshi, P. B.; Ren, B.; Wang, X. Electrochemical Surface-Enhanced Raman Spectroscopy. **NATURE REVIEWS METHODS PRIMERS** (2023), 3:79, 1-21.
4. Hernandez, S.; Perez-Estebanez, M.; Cheuquepan, W.; Perales-rondon, J. V. Raman, UV–Vis Absorption, and Fluorescence Spectroelectrochemistry for Studying the Enhancement of the Raman Scattering Using Nanocrystals Activated by Metal Cations. **ANALYTICAL CHEMISTRY** (2023) 95, 16070-16078.
5. Perales-Rondon, J. V.; Hernandez, S.; Gonzalez-Baro, A. C.; Heras, A.; Colina, A. Simultaneous Scanning Electrochemical Microscopy and UV–Vis Absorption Spectroelectrochemistry. **ANALYTICAL CHEMISTRY** (2023) 95, 10532–10539.



6. Hernandez, S., Perales-Rondon, J.V., Heras, A., Colina, A. "Simultaneous Raman and Reflection UV/Vis absorption Spectroelectrochemistry" **NANO RESEARCH** (2022) 15, 5340–5346.
7. S. Hernandez, J. V Perales-Rondon, A. Heras, A. Colina. "Enhancement factors in electrochemical surface oxidation enhanced Raman scattering" **ELECTROCHIMICA ACTA** (2021) 138223
8. Perales-Rondon, Colina, A, González, M.C., Escarpa, A. "Roughened silver microtubes for reproducible and quantitative SERS using a template-assisted electrosynthesis approach" **APPLIED MATERIALS TODAY** (2020) 10071
9. J. V. Perales-Rondon, S. Hernandez, D. Martin-Yerga, P. Fanjul-Bolado, A. Heras, A. Colina, Electrochemical surface oxidation enhanced Raman scattering, **ELECTROCHIM. ACTA**. (2018) 282, 377–383
10. J. Garoz-Ruiz, A. Heras, A. Colina, Direct determination of ascorbic acid in a grapefruit: paving the way for in vivo spectroelectrochemistry, **ANALYTICAL CHEMISTRY** (2017) 89, 1815-1822.

C.2. Congress

1. "On the Capabilities of Electrochemical Surface Oxidation Enhanced Raman Scattering for Analysis". *Electrochem 2023* (Bristol, UK). **2023. Keynote.**
2. "Unveiling the Origin of the Raman Enhancement During the Oxidation of Metal Electrodes". 74TH Annual Meeting of the International Society of Electrochemistry (Lyon, France). **2023. Oral communication.**
3. "Design of analytical strategies for the electrochemical enhancement of the Raman signal". XXXVIII Reunión Bienal de la Real Sociedad Española de Química (Granada) **2022. Invited Oral communication.**
4. "Multipulse strategies for the enhancement of the Raman signal". 73rd Annual Meeting of the International Society of Electrochemistry (on-line). **2022. Oral communication.**
5. "Electrochemical Surface Oxidation-Enhanced Raman Scattering on Copper: A New Phenomenon for Analysis". 71st Annual Meeting of the International Society of Electrochemistry (Jeju, Korea). **2021. Oral communication.**
6. "Recent Advances in Electrochemical Surface Oxidation-Enhanced Raman Spectroscopy". 71st Annual Meeting of the International Society of Electrochemistry (Belgrade, Serbia). **2020. Oral communication.**
7. "New Insights in Surface Oxidation Enhanced Raman Scattering Spectroelectrochemistry". XL Meeting of the Electrochemistry Group of the Spanish Royal Society of ChemistryXX Iberian Meeting of Electrochemistry. Huelva (España) **2019. Keynote.**
8. "Surface Oxidation Enhanced Raman Scattering Spectroelectrochemistry". XXXIX Meeting of the Electrochemistry Group of the Spanish Royal Society of Chemistry and 3rd E3 Mediterranean Symposium.Madrid (España) **2018. Keynote.**
9. "Spectroelectrochemistry of Graphene Quantum Dots". 69th Annual Meeting of the International Society of Electrochemistry. Bolonia (Italia). **2018. Oral communication.**
10. "Spectroelectrochemistry: a tool to study nanomaterials". DIPC School on PhotoElectroCatalysis at the Atomic Scale (San Sebastian). **2017. Invited Oral communication**

C.3. Research projects

1. **PID2023-149188OB-I00** Mas allá de la amplificación de la dispersión Raman por la superficie: mejora electroquímica de la señal Raman con fines analíticos **Agencia Estatal**



- de Investigación** PI: Alvaro Colina y Aránzazu Heras (Universidad de Burgos), Duration: 01/09/2024 – 31/08/2027. Funding: 150.000 €. Role: Principal Investigator
2. **PID2020-113154RB-C21** *Aplicación de nuevos materiales y dispositivos para EC-SERS Y EC-SOERS* **Agencia Estatal de Investigación** PI: Alvaro Colina y Aránzazu Heras (Universidad de Burgos), Duration: 01/09/2021 – 28/02/2025. Funding: 133.100 €. Role: Principal Investigator
 3. **Grant Agreement ID: 101046742. Mediated Biphasic Battery. European Innovation Council**, PI: Edgar Ventosa Arbaizar (Universidad de Burgos), Duration: 01/05/2022-30/04/2025. Funding: 544.313 €. Role: Investigator.
 4. **BU036P23** *Desarrollo de técnicas analíticas in-situ y en condiciones operando para el estudio de electrocatalizadores para la conversión electroquímica de nitrato de amoníaco* **Junta de Castilla y León**, PI: Aránzazu Heras y Edgar Ventosa (Universidad de Burgos), Duration: 30/10/2023-30/04/2027. Funding: 180.000 €. Role: Investigator.
 5. **Grant agreement ID: 101092347** *Converting Facilities Network for accelerating uptake of climate neutral materials in innovative products. European Innovation Council*, IP: Santiago Aparicio (Universidad de Burgos), Duration: 01/01/2023-31/12/2025. Funding: 750 000 €. Role: Investigator.
 6. **Grant Agreement ID: 861962** *GHz nanoscale electrical and dielectric measurement of the solid-electrolyte interface and applications in the battery manufacturing line* **H2020-NMBP-TO-IND-2019 DT-NMBP-08-2019 European Commission**, IP: Edgar Ventosa Arbaizar (Universidad de Burgos), Duration: 01/05/2020–31/03/2023. Funding: 190.937,50 €. Role: Investigator.
 7. **CTQ2017-83935-R** *Espectroelectroquímica Raman Cuantitativa* **Ministerio de Economía y Competitividad**, IP: Alvaro Colina Santamaría (Universidad de Burgos), Duration: 01/01/2018 – 31/12/2020. Funding: 68.970€. Role: Principal Investigator.
 8. **BU297P18** *Fusión de técnicas espectroelectroquímicas* **Junta de Castilla y León**, IP: Aránzazu Heras Vidaurre (Universidad de Burgos), Duration: 01/01/2018 – 31/12/2020. Funding: 120.000 €. Role: Investigator.
 9. **BU033U16** *Desarrollo de un equipo compacto de espectroelectroquímica Raman* **Junta de Castilla y León**, IP: Aránzazu Heras Vidaurre (Universidad de Burgos), Duration: 01/01/2016 – 31/12/2018. Funding: 120.000 €. Role: Investigator.
 10. **CTQ2014-55583-R** *“Espectroelectroquímica multifuncional: desarrollo de sensores para análisis in-situ”* **Ministerio de Economía y Competitividad**, IP: Alvaro Colina Santamaría (Universidad de Burgos), Duration: 01/01/2015 – 31/12/2017. Funding: 58.000 €. Role: Principal Investigator.

C.4. Contracts, technological or transfer merits

- * **License for know-how contract:** “Dispositivos e instrumentación para medidas espectroelectroquímicas”. IPs: ÁLVARO COLINA SANTAMARÍA, ARÁNZAZU HERAS VIDAURRE. Company: **Metrohm DropSens** Duration: 22/01/2014-21/01/2026. Funding based on sales.
- * **License for know-how contract** “Dispositivos e instrumentación para medidas de espectroelectroquímica Raman IPs: ÁLVARO COLINA SANTAMARÍA, ARÁNZAZU HERAS VIDAURRE. Company: **Metrohm DropSens**, Duration: 15/05/2017-14/05/2029. Funding based on sales.