

CV date	30/08/2023
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Part A. PERSONAL INFORMATION

First name	José Alberto		
Family name	PADRÓN NAVARTA		
Gender	M	Birth date	28/09/1982
ID number	53159638Z	https://www.iact.ugr-csic.es/en/personal/perfil/jose-alberto-padron-navarta/	
e-mail	alberto.padron@csic.es	URL Web	
Open Researcher and Contributor ID (ORCID)	0000-0003-1005-0012 Scopus link		

A.1. Current position

Position	Contratado Ramón y Cajal		
Initial date	01/09/2020		
Institution	Consejo Superior de Investigaciones Científicas		
Department/Center	Instituto Andaluz de Ciencias de la Tierra		
Country	Spain	Teleph. number	958460184
Key words	Metamorphic Petrology, Experimental Petrology, Volatile cycle		

A.2. Previous positions

Period	Position/Institution/Country
Since 10/2014	Permanent research position at the Centre National de la Recherche Scientifique (CNRS). UMR5243 Géosciences Montpellier (France). On secondment for five years.
7/2011 – 7/2014	Marie Curie Postdoctoral Fellow (International Outgoing Fellowship IOF, FP7 PIOF-GA-2010-273017, project HISLa-DR. From 7/2011 to 7/2014. Géosciences Montpellier (France)/Research School of Earth Sciences (Australia).
4/2010 – 4/2011	Postdoctoral Research Fellow at the Department of Mineralogy and Petrology – University of Granada (Spain).
3/2006 – 3/2010	Ph.D in Earth Sciences at University of Granada, Spain (PhD grant funded by the Spanish Government, FPU program).

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Habilitation à Diriger des Recherches (HDR)	University of Montpellier (France)	2018
PhD in Geology	University of Granada (Spain)	2010
Degree in Geology	University of Granada (Spain)	2005

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

I have a Ph.D. (2010) in Earth Sciences from the University of Granada. Since 2020 I hold a Ramón y Cajal research fellowship at the CSIC and since 2014 a CNRS (Centre National de la Recherche Scientifique) position. My research training includes more than four years of post- and pre-doctoral stays in foreign internationally recognized research centres including



the Research School of Earth Sciences (ANU, Australia) and Géosciences Montpellier (France) as a Marie-Curie IOF Fellow.

I am the author or co-author of more than 60 international articles including two recent (2022 and 2023) high-impact journals (Nature Geoscience). I have participated in more than 15 research projects, financed in national and international competitive calls, being the principal investigator (PI) in 8 projects granted with more than €590k. I have been recently awarded a competitive ERC Consolidator grant (2M€) that will boost our experimental knowledge about redox processes in the deep Earth. I reviewed more than 70 articles for JCR-SCI journals and I am a frequent referee for international research agencies such as ANR (France), SNSF (Switzerland), DFG (Germany) and NSF (USA).

During my research career in four different research centres, I have developed an extensive collaboration network, both nationally and internationally. My research focuses on the deep recycling of volatiles induced by the geodynamic activity of the Earth. I have carried out experimental, natural and thermodynamic modelling studies addressing the important feedback of physicochemical processes associated with dehydration reactions under high-pressure conditions, particularly those related to hydrated ultramafic systems (high-pressure serpentinites). These reactions generate a significant volume of fluids at depth and represent the main vector of geochemical exchange between the Earth's superficial and deep reservoirs, especially volatile, including oxygen and other multivalent elements such as sulphur. My main contribution to this field has been the development of a new bimodal dehydration model where contrasting kinetics and fluid flow coexist at decameter scales in subduction zone settings. I combine microstructural studies using backscattered electron diffraction (SEM-EBSD), mesostructure field observations, as well as experimental studies both in hydrostatic equilibrium and using fluid pressure gradients to establish the different scales of permeability and kinetics of this bimodal model. Another field of research I develop is the recycling of volatiles through point defects associated with hydrogen in the crystalline structure of minerals that make up the Earth's mantle. In this area, I have contributed by providing the first experimental data demonstrating the control that hydrogen's structural position has, both for its intrinsic diffusion and solubility in nominally anhydrous minerals from the mantle. More recently, I am developing a series of projects aimed at quantifying the redox exchange associated with serpentinite subduction. My work is focused on determining the cause of the high oxidation state of the hydrated melting zones in the context of volcanic arcs and on the study of the deep recycling of oxidized residues on the redox evolution of the Earth's mantle since the beginning of subduction.

Contributions to the training of Early-stage researchers.

Postdoctoral Researchers (1): Dr. Michał Bukala (POLAND). Grant: Juan de la Cierva - Advisor: Dr. José Alberto Padrón-Navarta (CSIC, IACT). Started on January 2023.

Pre-doctoral level: (1 + 2 in progress) Main supervisor of Dr. Maxime CLÉMENT that completed his PhD in Nov 2028 (University of Montpellier, France). Co-supervised by A. Tommasi. In progress: Main supervisor of 2 PhD candidates: M.Sc. Maria RAMON FERNANDEZ (start 1/10/22) and M.Sc. L. Samuel CRISTÓBAL DÍAZ (1/1/2023). Co-supervised by Carlos J. Garrido (CSIC, IACT).

Supervision of Master's/PhD students: María del Carmen Romero Toribio (JAE-Intro contract, CSIC, 2020, 3 months), Sara Sibil Guiseppina Guerini (2020, three-month stay from the University of Milan, Italy), Stefania Corvò (2017, Master 2, Erasmus+, Italy, 5 months), Thomas Leydier (2015, Master 1, 3 months France), Leonardo Garrido (2015, 1 month Universidad de Chile), Celine Crepisson (2013, ANU, 6 months Australia), Frauke Paterson (2012 UNA, 6 months Australia).

Part C. RELEVANT MERITS

C.1. Publications

Selection of 10 significant contributions (*corresponding author).

1. **Padrón-Navarta JA***, López-Sánchez Vizcaíno V.*, Menzel M, Gómez-Pugnaire MT, Garrido CJ. Mantle wedge oxidation from deserpentinisation modulated by sediment-derived fluids. Nature Geoscience (accepted on 12/01/23, in press).



2. Jollands, M.C.*; Muir, J., **Padrón-Navarta, JA.**, Demouchy, S., (2022). Modelling hydrogen mobility in forsterite as diffusion coupled to inter-site reaction. *Contrib. to Mineral. Petrol.* 2022 17710 177, 1–26. <https://doi.org/10.1007/S00410-022-01954-1>
3. Cerpa, N. G.*; Arcay, D., & **Padrón-Navarta, J. A.** (2022). Sea-level stability over geological time owing to limited deep subduction of hydrated mantle. *Nature Geoscience*, 15(5), 423–428. <https://doi.org/10.1038/s41561-022-00924-3> **6 citations**
4. **Padrón-Navarta, J.A.***, Hermann, J., (2017). A Subsolidus Olivine Water Solubility Equation for the Earth's Upper Mantle. *Journal of Geophysical Research : Solid Earth* 122, 9862-9880. **56 citas. Editor's highlighted.**
5. **Padrón-Navarta JA***, Hermann J, O'Neill HSC (2014) Site-specific hydrogen diffusion rates in forsterite. *Earth and Planetary Science Letters* **392**(0):100-112. **101 citations.**
6. **Padrón-Navarta, J.A.***, López Sánchez-Vizcaíno, V., Hermann, J., Connolly, J.A.D., Garrido, C.J., Gómez-Pugnaire, M.T. and Marchesi, C., 2013, Tschermak's substitution in antigorite and consequences for phase relations and water liberation in high-grade serpentinites. *Lithos* **15**, 186–196. **124 citations.**
7. Alt, J.C.*; Schwarzenbach, E.M., Früh-Green, G.L., Shanks Iii, W.C., Bernasconi, S.M., Garrido, C.J., Crispini, L., Gaggero, L., **Padrón-Navarta, J.A.**, Marchesi, C., Früh-Green, G.L., Shanks, W.C., Bernasconi, S.M., Garrido, C.J., Crispini, L., Gaggero, L., Padrón-Navarta, J.A.J.A., Marchesi, C., 2013. The role of serpentinites in cycling of carbon and sulfur: Seafloor serpentinization and subduction metamorphism. *Lithos* 178, 40–54. <https://doi.org/http://dx.doi.org/10.1016/j.lithos.2012.12.006> **161 citations.**
8. **Padrón-Navarta, J.A.***, Tommasi, A., Garrido, C.J., López Sánchez-Vizcaíno, V. Plastic deformation and development of antigorite crystal preferred orientation in high-pressure serpentinites (2012) *Earth and Planetary Science Letters*, **349-350**, pp. 75-86. **45 citations.**
9. **Padrón-Navarta, J.A.***, Sánchez-Vizcaíno, V.L., Garrido, C.J., Gómez-Pugnaire, M.T. Metamorphic record of high-pressure dehydration of antigorite serpentinite to chlorite harzburgite in a subduction setting (Cerro del Almirez, Nevado-Filábride complex, Southern Spain) (2011) *Journal of Petrology*, **52** (10), pp. 2047-2078. **105 citations.**
10. **Padrón-Navarta, J.A.***, Tommasi, A., Garrido, C.J., Sánchez-Vizcaíno, V.L., Gómez-Pugnaire, M.T., Jabaloy, A., Vauchez, A. Fluid transfer into the wedge controlled by high-pressure hydrofracturing in the cold top-slab mantle (2010) *Earth and Planetary Science Letters*, **297** (1-2), pp. 271-286. **55 citations.**

C.2. Conferences

I have presented more than 120 papers at national and international conferences; 30 as first author in oral presentations, of which 7 were as invited speaker at the AGU, EGU, Goldschmidt and the IGC. Likewise, I have delivered guest seminars at 7 international institutions; organized a total of 11 sessions at international congresses and co-organized an international congress ("Serpentine days", 2016, France) and a summer school (CNRS Petrochro, 2018, France).

C.3. Research projects, indicating your personal contribution.

1. Deep Earth's Oxygen recycling at subduction Zones (OZ).

Principal Investigator: **José Alberto Padrón-Navarta** (IACT, CSIC-UGR)

Type of participation: Principal investigator

Agency: ERC Consolidator Grant. Duration: 01/01/24-13012/28

Amount: €2,000,000

2. Oxidizing potential of serpentinite dehydration fluids in areas of subduction (OXIDIZE).

Principal Investigator: **José Alberto Padrón-Navarta** (IACT, CSIC-UGR)

Type of participation: Principal investigator

Agency: Projects of Excellence of the Junta de Andalucía. Duration: 01/01/23-13012/25

Amount: €169,527.

3. PID2019-105192GB-I00: High-pressure dehydration of serpentinites and its implications for subduction processes (DESTINE)



PI: C.J. Garrido (IACT, CSIC) and **José Alberto Padrón-Navarta** (IACT, CSIC)

Type of participation: Co-principal investigator

Personal contribution: Petrological, geochemical and textural analysis, phase relationships and advanced thermodynamic modelling of aqueous fluids with electrolytes.

Agency: MICINN. Duration: 07/01/20-06/30/23.

Amount: €114,950 (with associated FPI contract, pre-doctoral contract).

4. J1-3025 Extended defects in natural and synthesized perovskite oxides: nanogeochemical indicators and functional interfaces.

Principal Investigator: Dr. Nina Daneu (Institut Jožef Stefan, Ljubljana, Slovenia)

Type of participation: Member of collaborating researchers

Personal contribution: Characterization by backscattered electron diffraction of twin relationships in natural and synthetic samples of perovskites.

Agency: Public Investigation Agency, Republic of Slovenia).

Duration: 2021-2024. – Amount: €300k

5. RFC/FEDER-UJA 1263042. Contribution of the subduction of oficarbonates to the deep carbon cycle.

Principal investigator: Prof. Dr. Vicente Agustín López Sánchez-Vizcaíno (University of Jaén).

Agency: University of Jaén (RFC/FEDER). Duration: 01/01/2020 to 12/31/2021

Type of participation: member of the research team

Personal contribution: field study, sampling and petrological analysis using electron microscopy. – Amount: €67,675.48.

6. ANR-Tremplin-ERC2016: Deep W. Deep Water Transport.

Agency: Agence National de la Recherche (France).

Duration: 01/01/2017 – 06/01/2018 (18 months).

Principal Investigator: Dr. José Alberto Padrón-Navarta (CNRS, France)

Personal contribution: Development of a solubility equation for olivine under subsolidus conditions relevant to subduction zones.

Type of participation: Principal Investigator – Amount: €34,300.

7. BI-FR-PROTEUS/17-18-007/37457PK: Hydrous defects and twinning in silicates

Agency: Franco-Slovene bilateral project within the Hubert Curien Partnership (PHC) program – Slovenia: Ministry of Education, Science and Sport (MIZS) – France: the Ministries of Europe and Foreign Affairs (MEAE). Duration: 2017-2018 (2 years)

Personal contribution: Characterization by backscattered electron diffraction of twin relationships in natural and synthetic samples.

Type of participation: Co-principal investigator

PI in France: **Dr. José Alberto Padrón-Navarta** (CNRS, France)

PI in Slovenia: Dr. Nina Daneu (Institut Jožef Stefan, Ljubljana) – Amount: €6,000.

8. INSU-CNRS-AO2017-996352 : MinCompact. Mechanisms of transport of fluids produced by dehydration reactions: Étude des serpentinites de Malenco.

Agency: Institut National Sciences del l'Univers (INSU) – CNRS. TelluS-SYSTER program.

Duration: 01/01/2015 – 01/01/2017 (3 years).

Personal contribution: Microstructural study of natural and experimental samples related to the dehydration of serpentinites in crustal conditions.

Principal Investigator: Dr. José Alberto Padrón-Navarta (CNRS, France)

Type of participation: Principal Investigator – Amount: €17,000.

9. CGL2016-75224-R: DECORESERP. Devolatilization, CO₂ recycling and redox balances associated with serpentinite subduction: implications for the deep carbon cycle.

Agency: MICINN. Duration: 12/30/2016-12/29/2019.

Personal contribution: Petrological, mineralogical and textural study using electron microscopy.

Principal investigator: Prof. Dr. Vicente Agustín López Sánchez-Vizcaíno (University of Jaén, Center for Advanced Studies in Earth Sciences) – Amount: €68,000.