

**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                                     | Joaquín             |            |            |
| Family name                                    | Pérez Pariente      |            |            |
| Gender (*)                                     | Male                | Birth date | 18/08/1957 |
| Social Security, Passport, ID number           | 00671537Y           |            |            |
| e-mail   | jperez@icp.csic.es  | URL Web    |            |
| Open Researcher and Contributor ID (ORCID) (*) | 0000-0001-5322-9528 |            |            |

(\*) Mandatory

**A.1. Current position**

|                   |  |             |           |
|-------------------|--|-------------|-----------|
| Position          | Research Professor                                     |             |           |
| Initial date      | 30/06/2001   |             |           |
| Institution       | Consejo Superior de Investigaciones Científicas (CSIC) |             |           |
| Department/Center | Instituto de Catálisis y Petroleoquímica (ICP)         |             |           |
| Country           | Spain  | Tel. number | 915854784 |
| Key words         | Catalysis, zeolites, porous materials, synthesis       |             |           |

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

| Period    | Position/Institution/Country/Interruption cause          |
|-----------|--|
| 1986-1992 | Tenured Scientist at ICP (Spain)                         |
| 1992-2001 | Researcher at ICP (Spain)                                |
| 1996-2006 | Part-time Associated Lecturer, Univ. Complutense (Spain) |

**A.3. Education**

| PhD, Licensed, Graduate     | University/Country                      | Year |
|-----------------------------|---|------|
| Degree in Chemical Sciences | Universidad Autónoma de Madrid/Spain    | 1979 |
| PhD in Chemistry            | Universidad Complutense de Madrid/Spain | 1984 |

**Part B. CV SUMMARY**

I did my PhD in the Institute of Catalysis and Petroleum Chemistry of CSIC under the supervision of Prof. Avelino Corma, dealing on the development of monofunctional catalysts based on the fibrous natural magnesium silicate sepiolite. The same year that I got my PhD (1984), I started a two-years postdoc stay in the laboratory of Surface Chemistry and Catalysis of the Katholieke Universiteit Leuven headed by Prof. P. Jacobs. The propose of this postdoc research was to learn on synthesis and characterization of zeolites, with the purpose of starting a new research line on zeolite synthesis within Prof. Corma's research group once I was back in Spain. Zeolites and zeolite materials in general have since then been my main research topic, and I have been Responsible Researcher of the Molecular Sieves Group of ICP since this group was established in 1993. My work has mainly been focused on the design of specific synthesis procedures that lead to catalysts that possess particular configurations of highly active and selective active centers for different catalytic reactions. Some of the main achievements have been the incorporation for the first time of titanium in zeolite Beta and in the ordered mesoporous material denoted MCM-41, which has enlarged the application field of these materials as catalysts for the selective oxidation of organic substrate in mild conditions. The material Ti-MCM-41 was patented and licensed for the commercial production of ethylene oxide. A most recent advancement has been the design of a novel synthesis strategy to control the distribution of the acid active sites associated to aluminum in zeolites, which has contributed



to open a new research field. More recently, I have been involved in a new synthesis strategy that made use of supramolecular aggregates to obtain large-pore chiral zeolites, which has resulted in a patent filed in 2020 with PCT extension, and another one in 2022. I have established all along my research career fruitful collaboration with several research groups in Spain and abroad on topics that while not directly related to catalysis have been based on my knowledge of zeolite chemistry. In addition, they have expanded the multi and interdisciplinary character of my research. In 1996 I was appointed part-time Associate Lecturer at the Department of Bioinorganic Chemistry of the Faculty of Pharmacy of UCM, Madrid, headed by Prof. Maria Vallet-Regi to contribute to the development of a new research line on the development of mesoporous materials for the controlled release of drugs. We published in 2001 the first paper worldwide ever published on this topic. I have been collaborating with the Department of Physical Chemistry of Pais Vasco University for the development of materials with advanced optical properties based on the inclusion of dyes into the zeolites pores. I have also paid attention to aspects concerning sustainability and improving of life conditions in developing countries. This led me to research on sustainability of biofuels, whose conclusions are collected in the book published in 2016 cited in C.1. I have also been involved since 2011 in cooperation projects with the university of Addis Ababa funded by CSIC and AECID, to develop a material for the removal of fluoride from drinking water to be implemented in Ethiopian rural communities. A patent was issued and licensed in 2014 to a Spanish company which is now commercializing this technology, which is currently in use in two defluoridation plants in that country, inaugurated in November 2019 thanks to the funding of private Switzerland and Spanish foundations. All these research activities have been funded by 34 Research Projects (14 as Project Leader (PL)), 25 contracts with industries (10 as PL), 18 Projects of International Cooperation (6 as PL), with a total of 267 SCI papers, 19 Non-SCI (most in Scopus) papers and 31 patents, three of them licensed, 13 book chapters; co-author of 3 books, author of two books published in 2016 and editor of 3 books.

I have also been interested in the formation of young researchers, as evidenced in the supervision of 14 PhD and 13 Degree Thesis and a number of undergraduate *practicum*. I regularly participate in outreach activities and programs, mainly addressed to high school students, with lectures on sustainability, nanotechnology and catalysis. Since 2002, I share these activities with research and teaching on the history of chemistry (output: 25 articles and book chapters, 3 books, editor of one book, three research projects founded by National Agencies, Summer course at UIMP, CSIC/UAM yearly course since 2004), with focus on the replication of historical chemical procedures and their use for modern catalysis, which has led to the preparation of novel gold catalysts. I have been in 2017/2018 member of the Commission of the Chemistry Area of CSIC, and I have participated in evaluation panels of national research proposals and awards.

## Part C. RELEVANT MERITS

### C.1. Publications

- De la Serna, R., Arnaiz, I., Márquez-Álvarez, C., Pérez-Pariente, J., Gómez-Hortigüela, L. Inversion of chirality in GTM-4 enantio-enriched zeolite driven by a minor change in the structure directing agent. *Chem. Commun.*, 2022, 58, 13083-13086.
- R. de la Serna, D. Nieto, R. Sainz, B. Bernardo-Maestro, A. Mayoral, C. Márquez-Álvarez, J. Pérez-Pariente, L. Gómez-Hortigüela. GTM-3, an Extra-large Pore Enantioselective Chiral Zeolitic Catalyst, *J. Am. Chem. Soc.* 2022, 144, 8249-8256.
- Suárez, N., Pérez-Pariente, J., Mondragón, F., Moreno, A. Generation of hierarchical porosity in beta zeolite by post-synthesis treatment with the cetyltrimethylammonium cationic surfactant under alkaline condition. *Microp. Mesop. Mater.* 2019, 280, 144-150.
- Biocombustibles. Sus implicaciones energéticas, sociales y medioambientales.* Fondo de Cultura Económica. 2016. ISBN: 9786071637154.
- Mayoral, A., Agúndez, J., Pascual Valderrama, I. M., Pérez-Pariente, J. Generation of gold nanoparticles according to procedures described in the eighteenth century. *Gold Bulletin*, 2014, 47, 161-165.
- Gómez-Hortigüela, L., Pérez-Pariente, J., Chebude, Y., Díaz, I. Controlled growth of hydroxyapatite on the surface of natural stilbite from Ethiopia: application in mitigation of fluorosis. *RSC Adv.*, 2014, 4, 7998-8003.



- Pinar, A. B., Gómez-Hortigüela, L., McCusker, L. B., Pérez-Pariente, J. Controlling the aluminium distribution in the zeolite ferrierite via the organic structure directing agent. *Chem. Mater.*, 2013, 25, 3654-3661.
- Pinar, A. B., Márquez-Alvárez, Grande-Casas, M. Pérez-Pariente. Template-controlled acidity and catalytic activity of ferrierite crystals. *Journal of Catalysis*, 2009, 263, 258-265.
- M. Vallet-Regí, A. Rámila, R.P. del Real and J. Pérez-Pariente. A new property of MCM-41: Drug Delivery System. *Chem. Mater.*, 2001, 13, 308-311.
- M. A Camblor, A. Corma, A. Martínez, J. Pérez-Pariente. Synthesis of a titaniumsilicoaluminate isomorphous to zeolite Beta and its application as a Catalyst for the selective oxidation of large organic molecules. *J. Chem. Soc., Chemical Commun*, 1992, 589-590.

## C.2. Congress.

- Conferencia plenaria. Preparación de agregados de oro mediante procedimientos históricos y su actividad catalítica en reacciones de oxidación. Congreso de la Sociedad Española de Catálisis, 18-21 de octubre de 2021, Valencia.
- Conferencia plenaria. Antes de Faraday: una exploración de la síntesis de nanopartículas de oro mediante procedimientos históricos y estudio de su actividad catalítica en reacciones de oxidación. VI Congreso Internacional y XVI Congreso Mexicano de Catálisis, 10-15 de noviembre, 2019, Villahermosa, México.
- Conferencia plenaria. Apuntes históricos sobre los congresos Iberoamericanos de catálisis en su 50 aniversario (1968-2018). XXVI Congreso Iberoamericano de Catálisis, 9-14 septiembre 2018, Coimbra, Portugal.
- Pérez-Pariente, J., Gómez-Hortigüela, L., Sani, T., Mayoral, A., Chebude, .Y, Díaz, I. Controlled growth of nano-hydroxyapatite on Stilbite: Defluoridation performance. Oral. 18 International Zeolite Conference, Río de Janeiro, Brasil, 2016.
- Gómez-Hortigüela, L., Agudo, E., Pérez-Pariente, J., Sani, T., Chebude, .Y, Díaz, I., Defluoridation of drinking water using a composite based on stilbite from Ethiopia. Oral. 9th International Conference on the Occurrence, Properties and Utilization of Natural Zeolites. Belgrado, Serbia, 2014.
- Pérez-Pariente, J., Pascual Valderrama, I., Agúndez, J. Reproducibility of eighteenth-century recipes of Potable Gold. Oral. 9th International Conference for the History of Chemistry (Uppsala, Suecia, 2013.)
- Alfayate, A., Sánchez-Sánchez M., Pérez-Pariente, J. TAPO-5 prepared with Ti(III): unusual catalytic activity in cyclohexene oxidation with H<sub>2</sub>O<sub>2</sub> under anhydrous conditions. Oral. 17 Congreso Internacional de Zeolitas (Moscú, 2013).
- Conferencia invitada. Cooperative structure directing effects in the synthesis of crystalline molecular sieves. 4th International FEZA Conference, 2-6 Septiembre 2008, Paris, Francia.
- Conferencia plenaria. Synthesis and Properties of Mesoporous Materials of Enhanced Catalytic Activity. 13º Congreso Brasileiro de Catálisis y 3º Congreso de Catálisis del Mercosur, Septiembre 2005, Foz de Iguazú, Brasil.

## C.3. Research projects.

- Síntesis, desarrollo y actividad enantioselectiva de catalizadores zeolíticos quirales basados en el material GTM-3. Ref: PDC2022-133681-I00. IPs: Luis Gómez-Hortigüela Sainz y Joaquín Pérez Pariente. 1/12/2022-30/11/2024. Cuantía: 126.500 €.
- Ruta alternativa de bajo consumo de energía para el reciclado de CO<sub>2</sub> a metanol asistida por aminas. REF: TED2021-131143B-I00. 01/12/2022-30/11/2024. IPs: Joaquín Pérez Pariente y Manuel Sánchez Sánchez. Cuantía:115.000 €.
- Desfluorización y reutilización de residuos mediante recursos naturales en el Valle del Rift (RiFaWater). Etiopía. Entidad financiadora: AECID INNOVACIÓN (2020/ACDE/000373) Entidades: ASOCIACIÓN AMIGOS DE SILVA, TAGUA S.L. 15/02/2021 -15/02/2023. IP: Isabel Díaz Carretero. Cuantía: 100.000 €.
- Nuevas estrategias en la síntesis de catalizadores zeolíticos mejorados para procesos sostenible. Ref: PID2019-107968RB-I00. (1/06/2020-31/05/2023). IPs: Luis Gómez-Hortigüela y Joaquín Pérez Pariente. Cuantía: 181.500 €
- Integración de procesos fotocatalíticos y de adsorción para la eliminación de arsénico en aguas destinadas al consumo humano. Proyecto Explora CTM2015-72910-EXP. IP: María José López Muñoz. (1/05/2017-30/04/2019). Cuantía: 42.350 €



- Desarrollo de materiales catalíticos nanoporosos avanzados. Ref: MAT2016-77496-R. (1/01/2017-31/12/2019) IPs: Enrique Sastre y Carlos Márquez. Cuantía. 200.000 €
- Nuevos agentes directores de estructura quirales auto-ensamblables para la síntesis de materiales microporosos quirales. Ref: MAT2015-65767-P. (1/01/2016-31/12/2017) Investigador responsable: Luis Gómez-Hortigüela. Cuantía: 35.574 €.
- Estrategias para el diseño racional de centros activos altamente selectivos en materiales catalíticos nanoporosos. Ref: MAT2012-31127. (1/01/2013/31/12/2015). IP: Enrique Sastre (CSIC). Cuantía: 280.800 €.
- Diseño de materiales nanoporosos avanzados para catálisis heterogénea. Ref: MAT2009-13569. IP: Joaquín Pérez Pariente. (1/01/2010-31/12/2012). Cuantía: 341.220 €.
- Identificación y puesta en valor de obras de historia de la química de los fondos antiguos de bibliotecas españolas: un proyecto de construcción de una Biblioteca Histórica Química Virtual. Ref: HUM2007-30036-E/HIST. IP: Joaquín Pérez Pariente. 24/07/2008-23/07/2009. 12,000 €.

#### **C.4. Contracts, technological or transfer merits.**

- L. Gómez-Hortigüela, J. Pérez-Pariente, R. De la Serna, I. Arnaiz, J. Jurado, Material microporoso quiral enantio-enriquecido GTM-4, procedimiento de preparación y usos. Pat P202230707.
- L. Gómez-Hortigüela, J. Pérez Pariente, D. Nieto, B. Bernardo, R. de la Serna, R. Sainz Material microporoso quiral enantioenriquecido GTM-3, procedimiento de preparación y usos., Pat. P202030360, ext. Int. PCT/ES2021/070285. CSIC, 2020.
- Estudio y valoración de la posible aplicabilidad industrial de métodos de adsorción/desorción de hexafluoruro de azufre en materiales para ser utilizados en subestaciones eléctricas. Red Eléctrica Española. 29/07/2020-30/11/2021. IP: Carlos Márquez Álvarez. 132.203 €
- Apoyo científico al desarrollo industrial y a la comercialización de un sistema de eliminación de fluoruro en aguas de consumo humano. Tagua. 28/02/2017-3/03/2018. IP: Joaquín Pérez Pariente. 7.010 €
- Desarrollo de catalizadores y aditivos para mejora de rendimientos en unidades de coquización. Repsol. 2/11/2015-1/08/2017. IP: Carlos Márquez Álvarez. 192.400 €
- Nuevos catalizadores de alquilación de benceno para la producción de BIOLAS más eficaces desde el punto de vista energético. Cepsa. 03/02/2014-03/11/2018. IP: Enrique Sastre de Andrés. Cuantía: 321.666,40 €
- Desarrollo de un sistema de eliminación de fluoruros en agua potable basado en zeolitas naturales. Entidad: Tagua. 23/04/2014-22/04/2015. IPs: Isabel Díaz y Luis Gómez-Hortigüela. Cuantía: 86.000 €.
- Desarrollo de aditivos para el proceso FCC. Repsol. 1/01/2013-31/03/2015. IP: Joaquín Pérez Pariente. Cuantía: 220.279 €.
- Licencia de la patente "Material compuesto de estilbita-nanohidroxiapatita, procedimiento de preparación y utilización para la eliminación de fluoruro del agua", Gómez-Hortigüela, L., Pérez Pariente, J., Díaz Carretero, I. Chebude, Y., P201330262 y PCT/ES2014/070141, a la empresa española TAGUA, según contrato de licencia firmado el 14 de abril de 2014.
- Licencia de la patente "Material de estructura tipo zeolita de poros ultragrandes con una red constituida por óxidos de silicio y titanio; su síntesis y utilización para la oxidación selectiva de productos orgánicos ES2092428 (solicitud ES931327, año 1993), y sus correspondientes, europea, alemana y canadiense. Inventores. A. Corma, M. Navarro, J. Pérez Pariente. Licenciada a la empresa Sumitomo Chemicals en el año 2001, periodo de ejecución 08/02/2001-15/06/2013.