MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE (CVA)

CV date	27/06/2023

Part A. PERSONAL INFORMATION

Firstname	FRANCISCO		
Familyname	ESTRANY CODA		
Gender	Male	Birth date	01/09/1961
Social Security, Passport, ID number	37321021W		
e-mail	francesc.estrany@upc.edu	URL Web	
Open Researcher and Contributor ID (ORCID) (*)		I-6358-2014 6506397720	

A.1. Current position

Position	Associate Professor		
Initial date	10 – 10 - 1988		
Institution	POLYTECHNIC UNIVERSITY OF CATALONIA (UPC)		
Department/Center	CHEMICAL ENGINNERING		
Country	SPAIN	Teleph. number	934137496
Key words	conducting polymer – supercapacitor - nanotopography		

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

Period	Position/Institution/Country/Interruption cause
15/03/2020-30/05/2021	Associate Professor/UPC/Spain/ COVID19 restrictions

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Doctorate in Chemistry	Universitat de Barcelona	2003
Bachelor of Chemistry	Universitat de Barcelona	1993

A.4. Research

- Six years of Research granted: 3, the most recent in 2018.

- Thesis Supervised: **4**

1 – *Developmet of Flexible Electrodes and Lightweight Capacitors*. Date: 2018/03/23. Doctoral Student: Maricruz Saborío González. Polytechnic University of Catalonia (UPC).Department of ChemicalEngineering.

2 - *Estudio de mejora de las propiedades de polímeros conductores electrogenerados. Verificación de parámetros de aplicación tecnológica*. Date: 2017/10/25. Doctoral Student: Margarita Sánchez Jiménez. UPC.Dep. Chem. Eng.

3 - *Design, synthesis, characterization and development of novel organic conducting polymers with technological applications*. Date:2013/01/11. Doctoral student:Aradilla, D.UPC.DepChem. Eng.

4 - *Application of conducting polymers in nanobiotechnology*.Date: 2011/10/28. Doctoral student: Da Cruz Teixeira dias, Bruno José. UPC.Dep. Chem. Eng.

- Total number of Appointments in the last 12 years: **1127**
- Total number of publications in the first quartile: **51**
- Index h: **27**

Part B. CV SUMMARY

1998-2003: Doctoral Thesis Experimentation (University of Barcelona). Obtaining, structural study and physical properties of conductive polymers generated by anodic oxidation from heterocyclic monomers. Most important conclusion: effect of the molar flow of monomer on the degree of branching of the polymer generated at constant potential at low concentrations of monomer. Publications in specialized journals (eg, *Electrochimica Acta*).
2004: Entry into the Materials Innovation and Molecular Engineering Group (IMEM), of the UPC (Dr. Carlos Alemán), as an expert in the experimental generation of conducting polymers. Start of the line of new designs of conductive polymers for applicationsin corrosion protection and electronic components. Practical training for diverse members from the IMEM group. Publications in *Progr. Org. Coatings, Polymer, Org. Electr., Pol. Chem.*, etc.
Experimental-computing integration: Study of the effect of the type of dopant anion in processes of radical polycondensation, and modeled interpretations of the electrical properties of polymers and co-polymersa ccording to their composition. Publications in *Polymer, Chem. Physics, Polymer Chemistry*.
2005-2006: Application of conductive polymers in anticorrosive paints, in the form of charge micro-accumulator particles, successfully testing new multi-layer designs, with increased electroactivity. Publications (*Europ. Polym. J., J. App Pol. Res.,* etc.) and patenting.
2007: Design of biosensors, studies of interaction of conductive polymer substrates with DNA and biomolecules, and proliferation of eukaryotic cells. Publications (*Macromol. Mat. and Eng., Europ. Pol. J., Polymer*, etc.) and communications to international congresses. Desing of sensors for the detection of drugs and neurotransmiters (*Electr. Acta, J. Mat. Chem.*).
2009-2011: Specialization in AFM microscopy at the Center for Research in Nanoengineering (CRnE) of the UPC. Morpho-electrochemical analysis of the surface topography at nanoscale of conductive polymers (cyano-derivatives of pyrrole, and halogenated derivatives of thiophene), Publications in *Pol. Chem., J. Mat. Chem.*
2012-2015: Preparation of supercapacitors and organic-based electric batteries with conductive polymers. Improve of their mechanical properties with the formation of nanocomposites with ceramic materials, metals and oxides. Publications in *Org. electr., J. Phys. Chem. C*. Good current expectations of development of prototypes of organic batteries, involving hydrogels, organic redox systems and the triiodide anion.
Editor of the Journal "Técnica Industrial" of COGITI (General Council of the Official Associations of Technical Engineers of all the Spanish State), with peer-review procedure.
2015-2018: Preparation of flexible condensers based on polyglutamic acid hydrogels (PGGA) and cellulose, containing dispersions of poly (3,4-ethylenedioxythiopene) / clay nanoparticles (PEDOT / clay) and hydroxy-3,4-ethylenedioxythiopene (EDOT-OH). Published in *Journal of Physical Chemistry C* and *Carbohydrate Polymers*).
Verification of the n-doping of PEDOT with cationic agents, ionene isomers (such as 1,4-diazabicyclo, or DABCO). Published in *Phys. Chem., Chemical Physics* and *Soft Matter*.
2018-2020: Preparation of hydrogel platforms interpenetrated with conductive polymer and reinforced with microfibers generated by electrospinning, combining the flexibility and load capacity, the mechanical resistance of microfibers and the capability to detect the redox properties of drugs and control its release. Published in *Macromolecular Bioscience*.
Studies of the effect of the degree of interpenetration of the conductive polymer compatible with the internal hydrogel matrix (PHMeDOT), on the morphological and electrochemical properties of the resulting nanocomposite biohydrogel, with the determination of the optimal electropolymerization time. Published in *Journal of Applied Polymer Science*.
The research projects in which I am currently immersed are: the first, in the activation of polymeric insulating surfaces with the use of plasma treatment, obtaining useful electrodes to detect different types of specific biomolecules (such as neurotransmitters), which integrates the objective of Project 2021, and the second in the preparation of the biocompatible and high specific capacitance electrode interface, key component of a trifunctional sensor to measure physiological parameters, which is effective in measurement, implantable and bioabsorbable. This is the main objective, together with the assembly of the different components of the biosensor, of the current Doctoral Thesis that I am directing to Ms. Jillian Gamboa, Doctoral scholarship within the Marie Curie European Project in which I am a researcher, which has a horizon of the end of 2024.

Part C. RELEVANT MERITS

C.1. Publications

- Borras, Núria; Sanchez-Sanz, Alejandra; Sanz, Jordi; Estrany, Francesc; Perez-Madrigal, Mª del Mar; Aleman., Carlos. 2023. *Flexible electroactive membranes for the electrochemical detection of dopamine*. ***European Polymer Journal***. Vol. 187 DOI: 10.1016/j.eurpolymj.2023.111915
- Saborío, Maricruz.; Privat, Karen; Ngoc, Tran Bich.; Zetterlund, Per B.; Agarwal, Vipul; Estrany, Francesc. 2022. *Polymer/reduced graphene oxide/lignosulfonate nanocomposite films as pseudocapacitor cathodes*. ***ACS Applied Nano Materials***. Vol. 5. Pags: 3686-370.
- Fontana, A.; Ruano, Guillem; Silva, Fiorella; Estrany, Francesc; Puiggali, Jordi; Aleman, Carlos; Torras, Joan. 2021. *Poly(aspartic acid) biohydrogel as the base of a new hybrid conducting material*. ***International journal of molecular sciences***. Vol. 22. Pags: 1-13.
- Molina, Brenda G. ; Llampayas, Ariadna; Fabregat, Georgina; Estrany, Francesc; Aleman, Carlos; Torras, Juan. 2021. *Electroactive interpenetrated biohydrogels as hybrid materials based on conducting polymers*. ***Journal of Applied Polymer Science***. Vol. 138. DOI: 10.1002/app.50062
- Moghimiardekani, Ali; Molina, Brenda G; Enshaei, Hamidreza; del Valle, Luis J.; Perez-Madrigal, Maria M. ; Estrany, Francesc ; Aleman, Carlos. 2020. *Semi-Interpenetrated Hydrogels-Microfibers Electroactive Assemblies for Release and Real-Time Monitoring of Drugs*. ***Macromolecular Bioscience***. Vol. 20. DOI**:** 10.1002/mabi.202000074
- Saborio, Maricruz; Lanzalaco, Sonia; Fabregat, Georgina; Puiggali, Jordi; Estrany, Francesc; Aleman, Carlos. 2018. *Flexible Electrodes for Supercapacitors Based on the Supramolecular Assembly of Biohydrogel and Conducting Polymer*. ***Journal of Physical Chemistry C***. 2018. Vol. 122. Pags. 1078-1090.
- Perez-Madrigal, Maria M.; Edo, Miquel G.; Saborio, Maricruz; Estrany, Francesc;Aleman, Carlos. 2018. *Pastes and hydrogels from carboxymethyl cellulose sodium salt as supporting electrolyte of solid electrochemical supercapacitors*. **and *Carbohydrate Polymers***. Vol 200. Pags.456-467.
- Saborio, Maricruz G.; Bertran, Oscar; Lanzalaco, Sonia; Haering, Marleen; Diaz, David; Estrany, Francesc; Aleman, Carlos. 2018. *Cationic ionene as an n-dopant agent of poly(3,4-ethylenedioxithiophene).****Physical Chemistry Chemical Physics****.*Vol. 20.Pags.: 9855-9864.
- Perez-Madrigal, Maria M.; Estrany, Francesc; Armelin, Elaine; Diaz Diaz, David; Aleman, Carlos. 2016. *Towards sustainable solid-state supercapacitors: electroactive conducting polymers combined with biohydrogels.****Journal of Material Chemistry A.*** Vol. 4.Pags.1792-1805.
- Aradilla, David; Estrany, Francesc; Casellas, Francisco; Iribarren, Jose I.;Aleman, Carlos. 2014. *All-polythiophene rechargeable batteries*. ***Organic Electronics***.Vol. 15.Pags: 40-46.
- Aradilla, David; Estrany, Francesc; Aleman, Carlos.2013. *Synergy of the I-/I-3(-) redox pair in the capacitive properties of nanometric poly(3,4-ethylenedioxythiophene).* ***Organic Electronics***. Vol. 14. Pags: 131-142.
- Aradilla, David; Azambuja, Denise; Estrany, Francesc; Casas, Maria T.; Ferreira, Carlos A.; Alemán, Carlos. 2012. *Hybrid polythiophene-clay exfoliated nanocomposites for ultracapacitor devices*. ***Journal of Materials Chemistry***. Vol. 22. Pags.: 13110-13122.
- Aradilla, David; Casanovas, Jordi; Estrany, Francesc; Iribarren, Jose I.; Aleman, Carlos. 2012. *New insights into the characterization of poly(3-chlorothiophene) for electrochromic devices*. ***Polymer Chemistry***.Vol. 3.Pags.: 436-449.

C.2. Congress

- Poster: *Sustained release of a pharmacological chaperone that increases the activity of misfolded ß-Glucocerebrosidase*. Enshaei, Hamidreza; Molina, Brenda; del Valle, Luis Javier; Estrany, Francesc; Arnan, C.; Puiggali, Jordi; Saperas, Núria; Aleman, Carlos. *XXVI Jornada de Biologia Molecular*. *Societat Catalana de Biologia (SCB).* June 2019. Barcelona.

- Poster: *Three-layered films of conducting polymers as electrochemical supercapacitors. enhancement of charge storage capacity by nanophase-segregation in the dielectric layer.* Borràs Núria; Estrany, Francesc; Aleman, Carlos. XL Meeting of the SEG of the RSSC. July 2019. Huelva.
- Poster. *Biosensor platforms for selective neurotransmitter detection*. Molina, Brenda .G.; Cianga, L.; Cianga, Ioan; del Valle, Luis J.; Estrany, Francesc.; Armelin, Elaine.; Aleman, Carlos. Polymers 2018: Design, Function and Application. March 2018. Barcelona.
- Poster. *Aumento de la electroactividad de films de poli(N-metilpirrol) por incorporación de nanopartículas de trióxido de molibdeno*. Estrany, Francesc.; Sanchez, Margarita.; Aleman, Carlos. : *38ª Reunión del Grupo de Electroquímica de la RSEQ. 2017. Vitoria-Gasteiz.*
- Poster. *Activación de la capacitancia de films de PEDOT por adición de nanopartículas de alúmina*. Estrany, Francesc.; Sanchez, Margarita; Borras, Núria.; Aleman, Carlos.; Saborío, Mª Cruz. 37ª Reunión del Grupo de Electroquímica de la Real Sociedad Española de Química. July 2016. Alicante.
- Poster. *Electrocompatible interfaces formed by electroactive conducting polymers combined with biohydrogels towards sustainable solid-state supercapacitors*. Pérez-Madrigal, Maria M.; Estrany, Francesc; Armelin, Elaine; Díaz-Díaz, David; Aleman, Carlos. European Materials Research Society - Spring Meeting. April 2016. Lille.
- Poster. *Aumento de la electroactividad y la electroestabilidad de films de PEDOT electrodepositados en condiciones dinámicas en medios de baja concentración de monómero y de electrolito*. Sánchez, Margarita.; Aleman, Carlos.; Estrany, Francesc. 36ª Reunión del GE de la RSEQ. 2015. Vigo.
- Poster. Electrodeposición de Composites de poli(N-metilpirrol) con nanopartículas de Cu. Sánchez, Margarita; Aleman, Carlos; Estrany, Francesc. 13ª Reunión del Grupo Especializado de Polímeros (GEP) de la RSEQ y RSEF. 2014. Girona.
- Poster. Ultracapacitors made of hybrid conducting polymer-clay exfoliated nanocomposites. Estrany, Francesc.; Aleman, Carlos.; Casas, Maria. Europ. Pol. Fed. (EFP). 2013. Pisa.
- Poster. *Aplicación de los compuestos multicapa de polímeros conductores para la preparación de supercapacitores simétricos*. Estrany, Francesc.; Aradilla, David.; Armelin, Elaine.; Aleman, Carlos. 33ª Reunión del GE de la RSEQ. 2012. Miraflores de la Sierra.
- Poster. *Improve the mechanical properties of electroactive materials: PEDOT-Bentonite and multilayer PEDOT/poly(N-methylpyrrole)/Montmorillonite exfoliated nanocomposites.* Estrany, Francesc; Aradilla, David; Aleman, Carlos. XII GEP Congress. 2011. Granada.

C.3. Research projects

Ref: PID2021-125767OB-I00
Título: *Plataformas conductivas e interactivas multifuncionales basadas en hidrogel para aplicaciones biomédicas: restauración de tejidos cardíaco, cutáneo y nervioso.*
Financing entity: *Agencia Estatal de Investigación, Ministerio de España (MCIN)*
Participating entities: *Universitat Politècnica de Catalunya*
Duration, from: 01/09/2022 **to:** 31/08/2025
Amount of the subsidy: 314,600 €
Researcher responsible: C. Alemán

Ref: PLEC2022-009279
Título: *3D (bio)printing for integrating BIOMimetic Electronics into Engineered Tissues: A giant leap in regenerative medicine (3D-BIOMEET*).
Financing entity: *Agencia Estatal de Investigación, Ministerio de España (MCIN)*
Participating entities: *Universitat Politècnica de Catalunya*
Duration, from: 31/07/2022 **to:** 30/07/2025
Amount of the subsidy: 272,306 €
Researcher responsible: J. M. García Torres

Ref: H2020-MSCA-ITN-2020, Nº955643
Título: Multidisciplinary Training of Young Researchers in Novel Implantable Bio-inspired Sensors-BioSpiring.
Financing entity: *Commission of European Communities*

Participating entities: UPC, Cherry Biotech, Uniwersytet Warszawski, Universite de Lausanne, VIV VZW, Rijksuniversiteit Groningen, Universita degli studi di Teramo, Zymvol Biomodeling S.L
Coordinating entity: UPC
Duration, from: 01/01/2021 **to:** 31/12/2024
Amount of the subsidy: 812,849.76 €
Researcher responsible: J. Torras

Ref: RTI2018-098951-B-I00.
Title: *Dispositivos autónomos para la detección y la liberación: Ensamblaje de sistemas biomédicos para el diagnóstico la terapia.*
Financing entity: *Agencia Estatal de Investigación*
Participating entities: *UPC; Universidad de Barcelona (UB); Universitat de Lleida*
Duration, from: 01/01/2019 **to:** 30/06/2022
Amount of the subsidy: 302,500 €
Researcher responsible: Alemán Llansó, Carlos Enrique.

Ref: MAT2015-69367-R.
Title: *Piel electrónica Inteligente*
Financing entity: Ministerio de Economía y Competitividad (MCI).
Participating entities: UPC; Universidad de Barcelona (UB); Universitat de Lleida
Duration, from: 01/01/2015 **to:** 31/12/2018
Amount of the subsidy: 242,000 €
Researcher responsible: Alemán Llansó, Carlos Enrique.

Ref: MAT2012-34498
Title: *Polimeros conductores y sus derivados híbridos con aplicaciones avanzadas.*
Financing entity: *Ministerio de Economía y Competitividad (MCI)*.
Participating entities: *UPC; Universidad de Barcelona (UB); Universitat de Lleid*a
Duration, from: 01/01/2013 **to:** 31/12/2015
Amount of the subsidy: 193,050 €
Researcher responsible: Alemán Llansó, Carlos Enrique.

C.4. Contracts, technological or transfer merits

- Inventors (in order of signat.): Armelin, Elaine; Aleman, Carlos; Iribarren, J. Ignacio; Liesa, Francisco; Estrany, Francesc.
Title: Environmental anti-corrosive additives based on poly (alkyl thiophene acetates) dispersible in priming paints for metal surfaces.
Application Number: 138925
Country of priority: United States of America
Priority date: 10/25/2011
Titular Entity: UPC

- Inventors (in order of signat.): Armelin, Elaine; Aleman, Carlos; Iribarren, J. Ignacio; Liesa, Francisco; Estrany, Francesc.
Title: *Aditivos anticorrosivos medioambientales basados en poli(acetatos de alquil tiofeno) fácilmente dispersables en pinturas de imprimación para superficies metálicas*.
Application Number: 070820
Country of priority: España
Priority date: 12/14/2010
Titular Entity: UPC