

<b>Part A. Personal Information</b>		<b>DATE</b>	16/04/2020
Surname(s)	Gómez Torregrosa		
Forename	Roberto		
Social Security, Passport, ID number			
Sex	Male		
Age	53		
Researcher codes	WoS Researcher ID (*)	N-4711-2014	
	SCOPUS Author ID(*)	7402249492	
	Open Researcher and Contributor ID (ORCID)	0000-0002-5231-8032	

(\*) At least one of these is mandatory

### A.1. Current position

Post/ Professional Category	Full Professor (Catedrático)		
UNESCO Code	221001, 221005, 221022		
Key Words	Photochemistry, Electrochemistry, Semiconductors, Batteries		
Name of the University/Institution	University of Alicante		
	Department/Centre	Physical Chemistry/ Institute of Electrochemistry	
	Full Address	School of Sciences F. II, Ap. 99, E-03080 Alicante, Spain	
	Email Address	roberto.gomez@ua.es	
	Phone Number	-34 965903748	
Start date	25/10/2015		

### A.2. Education (title, institution, date)

Year	University	Degree	Title
1990	University of Alicante	First degree	Bachelor-Master degree in Chemical Sciences
1994	University of Alicante	PhD	PhD degree in Chemical Sciences

### A.3. Indicators of Quality in Scientific Production (See the instructions)

<b>Citations:</b> 7327	Average citations/year (last 5 years): 508
JCR articles (Q1): 121	Total publications: 162 (incl. book chapters)
JRC articles (D1): 30	h Index: 45 (Scopus)
Six-year research periods: 4	Last one recognized: 2009-14
Thesis supervised: 10	

### Part B. Free Summary of CV (Max. of 3.500 characters, including spaces)

After obtaining his PhD degree from the University of Alicante, he was a Fulbright postdoctoral fellow in the US in 1995 (Purdue Univ. with M.J. Weaver). He rejoined the University of Alicante (UA) in 1996 as an Assistant Professor, becoming Associate Professor in 1999 and finally Full Professor in 2015. In the 90s, his activity focused on the electrochemistry of noble metal single crystal electrodes, investigating interfacial phenomena, surface modification and electrocatalysis by means of various electrochemical and spectroelectrochemical techniques (FTIR or Raman). In this period, he published 44 articles (31 Q1). From 1999, he simultaneously investigated on the electrochemistry of metals and semiconductors. For training purposes, he made stays funded by the Spanish Administration at the University of Bath (with L.M. Peter, 1999) and at NREL (with A. Nozik, 2000), working on sensitized solar cells. Between 2002 and 2006, he conducted research on the application of photoelectrochemical methods for understanding photocatalytic processes under the framework of an agreement between the UA and the CSIC. In this period he continued researching on the electrochemistry of metals, mainly studying the thermodynamics of electrosorption and the application of Raman spectroscopy to electrodes of metal nanoparticles. Between 2000 and 2006, he was project leader for the first time of

two publicly funded projects and published 35 articles (25 Q1). From 2007, he continued to perform studies on nanoporous oxide electrodes focused on the effects of nanostructure, electrochemical pretreatments or adsorption of modifiers and on the application of infrared spectroscopy. He also studied (photo)electrochromism. In the framework of a CONSOLIDER project, from 2007 to 2014, he resumed research on quantum dot solar cells. On the other hand, he initiated research on artificial photosynthesis (water splitting) with semiconductor electrodes in 2012. In the last five years, he has also been researching on the development of sodium-based batteries and supercapacitors and on Mg-based batteries. Finally, he also works on the modeling of microreactors to carry out reactions assisted by ultrasound and on electrochemical methods for by-products (lignin) valorization. Since 2007 he has published 66 articles (61 Q1) and has led/leads a total of 5 national and 3 European projects (one as a coordinator) as well as 5 contracts with companies (SMEs). In addition, since 2010 he leads the group "Photochemistry and Electrochemistry of Semiconductor Materials".

The objectives of its research lines are:

- 1) Photoelectrochemistry: achieving a better understanding of the factors that make a material suitable for its use as a photocathode for the reduction of water or carbon dioxide or as a photoanode for water oxidation. The final objective would be the manufacture of artificial photosynthesis devices for the generation of solar fuels.
- 2) Batteries: developing cost-effective supercapacitors and batteries based on sodium or magnesium and investigating different energy conversion processes in which electrochemistry plays a role.
- 3) Applied Electrochemistry: development of electrochemical methods and reactors for the valorization of raw materials (lignin).
- 4) For the systems mentioned above and other electrochemical or catalytic systems, achieving a detailed understanding of their mechanism of action through the development of analytical physicochemical models or by numerical simulation.

## **Part C. Relevant accomplishments**

### **C.1. Publications**

1. Mendieta-Reyes, N.E.; Cheuquepán, A.K.; Rodes, R.; Gómez, R., 2020, Spectroelectrochemical Study of CO<sub>2</sub> Reduction on TiO<sub>2</sub> Electrodes in Acetonitrile. ACS Catalysis. 10, pp. 103 – 113.
2. Cots, A.; Bonete, P.; Gómez, R., 2018, Improving the Stability and Efficiency of CuO Photocathodes for Solar Hydrogen Production through Modification with Iron. ACS Applied Materials and Interfaces. 10, pp. 26348 – 26356.
3. Cots, A.; Bonete, P.; Sebastián, D.; Baglio, V.; Aricò, A.S.; Gómez, R., 2018, Toward Tandem Solar Cells for Water Splitting Using Polymer Electrolytes. ACS Applied Materials and Interfaces. 30, pp. 25393 – 25400.
4. Mendieta-Reyes, N.E.; Díaz-García, A.K.; Gómez, R., 2018, Simultaneous Electrocatalytic CO<sub>2</sub> Reduction and Enhanced Electrochromic Effect at WO<sub>3</sub> Nanostructured Electrodes in Acetonitrile. ACS Catalysis. 8, pp. 1903 – 1912.
5. Díez-García, M.I.; Gómez, R., 2017, Metal Doping to Enhance the Photoelectrochemical Behavior of LaFeO<sub>3</sub> Photocathodes. ChemSusChem. 10, pp. 2457 - 2463.
6. Ruiz-Martínez, D.; Kovacs, A.; Gómez, R., 2017, Development of novel inorganic electrolytes for room temperature rechargeable sodium metal batteries. Energy & Environmental Sciences. 10, pp. 1936-1941.
7. Quiñonero, J.; Gómez, R., 2017, Controlling the amount of co-catalyst as a critical factor in determining the efficiency of photoelectrodes: The case of nickel (II) hydroxide on vanadate photoanodes. Applied Catalysis B-Environmental., 217, pp. 437 – 447.
8. Díez-García, M.I.; Lana-Villarreal, T.; Gómez, R., 2016, Study of Copper Ferrite as a Novel Photocathode for Water Reduction: Improving Its Photoactivity by Electrochemical Pretreatment. ChemSusChem. 9, pp. 1504 – 1512.

9. Díez-García, M.I.; Gómez, R., 2016, Investigating Water Splitting with CaFe<sub>2</sub>O<sub>4</sub> Photocathodes by Electrochemical Impedance Spectroscopy. ACS Applied Materials and Interfaces, 8, pp. 21387 - 21397.

10. Quiñonero, J.; Lana-Villarreal, T.; Gómez, R., 2016, Improving the photoactivity of bismuth vanadate thin film photoanodes through doping and surface modification strategies. Applied Catalysis B-Environmental. 194, pp. 141 - 149. 2016.

## C.2. Research Projects and Grants

**Reference:** LIBERATE/ **Title:** lignin biorefinery approach using electrochemical flow / **Funding entity /Call:** European Commission (2020 Horizon)/ **Main Researcher:** Roberto Gómez Torregrosa (Universidad de Alicante)/ **Dates:** 1/10/2018-30/09/2022/ **Funding:** 604,872 €/.

**Reference:** FOTOH<sub>2</sub>/ **Title:** Innovative photoelectrochemical cells for solar hydrogen production/ **Funding entity /Call:** European Commission (2020 Horizon)/ **Main Researcher:** Roberto Gómez Torregrosa (Universidad de Alicante)/ **Dates:** 01/01/2018-31/12/2020/ **Funding:** 571.096,25 €/ PROJECT COORDINATOR.

**Reference:** MAT2015-71727-R/ **Title:** Electrochemistry of ternary oxides applied to energy conversion and accumulation/ **Funding entity and call:** Ministerio de Economía y Competitividad (Programa estatal de investigación, desarrollo e innovación orientada a los retos de la sociedad, 2015)/ **Main researcher (Organization):** Roberto Gómez Torregrosa (Universidad de Alicante)/ **Dates:** 01/01/2016-31/12/2018/**Funding:** 72.600 €/

**Reference:** MAPSYN/ **Title:** Microwave, Acoustic and Plasma Assisted Synthesis/ **Funding entity /Call:** European Commission (FP7)/ **Main researcher (Organization):** Roberto Gómez Torregrosa (Universidad de Alicante)/ **Dates:** 01/12/2012-31/05/2016/ **Funding:** 180.000 €/

**Reference:** MAT2009-14004/ **Title:** Electrochemistry of titanium dioxide nanomaterials: fundamentals and applications/ **Funding entity and call:** Ministerio de Economía y Competitividad (proyectos de investigación fundamental no orientada 2009)/ **Main researcher (Organization):** Roberto Gómez Torregrosa (Universidad de Alicante)/ **Dates:** 01/01/2010-31/12/2012/ **Funding:** 121.000 €/

**Reference:** CSD2007-00007/ **Title:** Hybrid Optoelectronic and Photovoltaic Devices for Renewable Energy, HOPE/ **Funding entity and call:** Ministerio de Ciencia e Innovación (Programa CONSOLIDER-INGENIO 2010, Convocatoria 2007)/ **Main Researcher (Organization):** Roberto Gómez Torregrosa (Universidad de Alicante)/ **Start and end dates:**10/12/2007-09//05/2013/ **Funding:** 288.546 €.

## C.3. Contracts

**Title:** R+D project SUN2HY/ **Funding entity:** REPSOL S.A./ **Main Researcher (Organization):** Vicente Montiel Leguey (Universidad de Alicante)/ **Start and end dates:**01/05/2019-20//04/2021/ **Funding:** 393.937,28 €

**Title:** ELECTRODES AND ELECTROLYTES FOR SODIUM-BASED BATTERIES AND SUPERCAPACITORS (BROADBIT-BO1-16I)/**Funding entity:** BROADBIT BATTERIES OY/ **Main researcher (organization):** Roberto Gómez Torregrosa (Universidad de Alicante); **Dates:** 22/07/2016-21/12/2016/ **Funding:** 20.600 €

**Title:** DEVELOPMENT OF SODIUM-BASED BATTERIES AND SUPERCAPACITORS ON A PILOT PLANT SCALE (BROADBIT-ET1-15I)/ **Funding entity:** BROADBIT ENERGY TECHNOLOGIES/**Main researcher (organization):** Roberto Gómez Torregrosa (Universidad de Alicante); **Dates:** 01/05/2015-01/01/2016/ **Funding:** 37.500,00 €

**Title:** Pilot Plant Development for Sodium Based Batteries and Supercapacitors (BROADBIT1-14I)/ **Funding entity:** Broadbit Slovakia/ **Main researcher (Organization):**

Roberto Gómez Torregrosa (Universidad de Alicante); **Dates:** 28/02/2014-28/02/2015/  
**Funding:** 76.000 €.

**Title:** Development of Electrodes and Electrolytes for a sodium metal battery (BROADBIT1-131)/ **Funding entity:** Broadbit Slovakia/ **Main researcher (Organization):** Roberto Gómez Torregrosa (Universidad de Alicante); **Dates:** 30/09/2013-30/07/2014/ **Funding:** 5.600 €.

**Title:** Synthesis and Characterization of Nanoporous Carbons and Electrolytes for Electrochemical Use (BROADBIT2-121)/ **Funding entity:** Broadbit Slovakia/ **Main researcher (Organization):** Francisco Rodríguez Reinoso (Universidad de Alicante); **Dates:** 28/11/2012-28/11/2013/ **Funding:** 96.400 €.

#### C.4. Patents and other IPR

1. **Title:** Reactor capilar con ultrasonidos/ **Authors:** Navarro Brull, F.J.; Gómez Torregrosa, R. **Holder Entity:** Universidad de Alicante/ **Application number:** P201830422/ **Priority country:** Spain /**Application date:** 27/04/2018

2. **Title:** Rechargeable sodium cells for high energy density battery use **Date:** 03/04/2016; **Authors:** Kovacs, A.; Ruiz Martínez, D.; Gómez Torregrosa, R.; Alasaarela, T; Brown, D./ **Application number:** FI20165184A/ **Priority country:** Finland/**Holder Entity:** BROADBIT/ BATTERIES OY/ **Extended to:** 2017 KR BR WO CN AU CA TW PE 2018 IL

3. **Title:** Electrochemical secondary cells for high-energy or high-power battery use. **Date:** 30/09/2015; **Authors:** Kovacs, A.; (Alasaarela, T; Brown, D.); Ruiz Martínez, D.; Orts Mateo, J.M.; Gómez Torregrosa, R./ **Application number:** FI126390B/ **Priority country:** Finland/**Holder Entity:** BROADBIT BATTERIES OY// **Extended to:** 2016 KR CN BR EP CA JP US WO 2018 IL

#### C.5, C.6, C.7... Other

##### C.5. PhDs

**Name:** Néstor Guijarro Carratalá/ **Title:** Study of the photoelectrochemical properties of nanostructured titanium oxide electrodes sensitized with quantum dots: Application to hybrid solar cells/ **Presentation date:** 14/05/2013/ **Publications derived from the thesis:** (1) Phys. Chem. Chem. Phys., 2014, 16: 9115; (2) Ener. Environ. Sci., 2012, 5: 9760; (3) J. Phys. Chem. Lett. 2012, 3: 3367; (4) ChemPhysChem, 2012, 13: 3589; (5) Chem. Commun. 2012, 48: 7681; (6) J. Phys. Chem. Lett. 2012, 3: 1351; (7) Phys. Chem. Chem. Phys. 2011, 13: 12024; (8) Phys. Chem. Chem. Phys., 2011, 13: 4013; (9) J. Phys. Chem. C, 2010, 114:21928; (10) J. Phys. Chem C, 2010, 114: 22352; (11) Nanotechnology, 2009, 20 :295204; (12) J. Phys. Chem C, 2009, 113:4208.

**Name:** Milena Jankulovska/ **Title:** Study of the electrochemical properties of nanostructured TiO<sub>2</sub> electrodes/ **Presentation date:** 29/06/2015/ **Publications derived from the thesis:** (1) ACS Appl Mater Interfaces, 2014, 6: 10304; (2) J. Phys. Chem. C, 2013, 117:4024; (3) Int. J. Hydrogen Energy, 2013, 38: 2746; (4) ChemPhysChem, 2012,13:3008; (5) ChemPhysChem, 2012, 13: 2824; (6) Electrochim. Acta, 2012, 62:172; (7) Electrochem. Comm. 2010, 12:1356.

##### C.6. Member of international committees

**Title:** COST Action D41 "Inorganic oxides: surfaces and interfaces"/ **Activity:** National representative in the Management Committee/ **Dates:** From: 10/09/2006 To: 24/09/2010

##### C.7. Management of the scientific activity

**2010-:** Head of the reserach group "Photochemistry and Electrochemistry of Semiconductors" (recognized by the University of Alicante).