

José H. Zagal is a Distinguished Professor at the Faculty of Chemistry and Biology of the University of Santiago de Chile and is the Director of Laboratory of Electrocatalysis and Molecular Electronics. He got his first Degree in Chemistry from the University of Chile in 1973 and his Ph.D. from Case Western Reserve University, Cleveland, Ohio (USA) in 1978. He was a postdoctoral Fellow at Brookhaven National Laboratory Upton, New York in 1982. He has established reactivity descriptors and volcano correlations for the activity of molecular catalysts covering not only fuel cell reactions like O₂ reduction and hydrazine oxidation, but also for many other electrochemical processes showing that these reactivity descriptors seem to be universal. He has demonstrated different ways for tuning the catalytic activity of MN₄ catalysts involving a great variety of metal complexes for many reactions *via* controlling the electron-withdrawing ability of the ligand and by biomimetically by the presence of axial ligands and tuning the electron density and binding properties of the metal center. He has also contributed in the field of conductive polymers, molecular electronics, sensors, corrosion and coordination chemistry. He was awarded the Presidential Chair in Science by the President of Chile in 1996 by a Jury involving Chemistry Nobel Laureate Rudolph A. Marcus and Physics Nobel Laureate David Gross. He has also received several other Chilean national awards. In 2014 he was awarded the Fellow category of The International Society of Electrochemistry and became a Fellow of The Electrochemical Society the same year. In 2018 he became a Fellow of The Royal Society of Chemistry and an Emeritus Member of The Electrochemical Society. He is an active Member of the Academy of Sciences of Latin America (ACAL).



He joined the International Society of Electrochemistry in 1990, founded the Chilean Region of ISE in 2002 and became its first representative which now has 38 members of which 3 of them have received ISE awards. He served in the nominating committee of ISE from 2002 to 2004. At present he is a Vice-Chair of Molecular Electrochemistry Division 6 of ISE. He is President and founder of the Chilean Association of Carbonaceous Materials and President of the Iberoamerican Society of Electrochemistry (SIBAE) that involves the whole Spanish and Portuguese speaking countries both in Europe and the Americas. He has published over 260 papers, 9 book chapters, co-authored and edited 4 books, and has been awarded 3 patents. He has 14885 citations in Google Scholar with an impact factor of H = 65. He has served in the Editorial Boards of *J. Appl. Electrochem.* (1988-2010), *J. Chil. Chem. Soc.* (1984-2007), *Electrocatalysis*, (2009-2015), *Inter. J. Electrochem.* (2010-2019) and is presently a member of the Editorial Boards of: *J. Solid State Electrochem.*, *Electrochem. Comm.*, *Frontiers in Chemistry*, *J. Serbian Chemical Soc.*, *Electrochemical Energy Tech*, *Current Electrocatalysis* and *Chimica Nova (Brasil)*. He has been a Guest Editor of Special Issues of the *Int. J. Electrochem.*, *J. Applied Electrochem.*, *Molecules* and *Current Opinion in Electrochemistry*. He has supervised ca. 70 undergraduate and graduate thesis and 23 postdocs.

Recent publications (2018-2020)

1. R. A. Matute, A. Toro-Labbé, M. P. Oyarzún, S. Ramirez, D. E. Ortega¹, K. Oyarce, N. Silva, J. H. Zagal "Experimental and Theoretical Study of the Reactivity Descriptors of Fe macrocyclic complexes and hybrid multiwalled carbon nanotube/Fe complex on OPG electrode for the Oxidation of Thiols: Thioglycolic acid oxidation reaction". To be submitted to *Electrochim. Acta* (2020)
2. M. P. Oyarzún, N. Silva, D. Cortés-Arriagada, J. F. Silva, M. Flores, K. Tammeveski, D. Bélanger, A. Zitolo, F. Jaouen and J. H. Zagal "Enhancing the Catalytic Activity of Fe Phthalocyanines for Oxygen Reduction by the Presence of Axial Ligands: Pyridine-functionalized Single-walled Carbon Nanotubes" to be submitted to *ACS Catalysis* (2020)
3. J. Govan, G Abarca, C Aliaga, B Sanhueza, W Orellana, G Cárdenas-Jirón, J.H. Zagal, F.Tasca "Influence of cyano substituents on the electron density and catalytic activity towards the oxygen reduction reaction for iron phthalocyanine. The case for Fe(II) 2,3,9,10,16,17,23,24-octa(cyano)phthalocyanine, *Electrochem. Comm.*, 118, (2020) 106784
4. K Muñoz-Becerra, R Venegas, L Duque, J.H. Zagal, FJ Recio "Recent Advances of Fe-NC pyrolyzed catalysts for the oxygen reduction reaction" *Current Opinion Electrochem.*, 23 (2020) 154-161
5. K. Muñoz-Becerra, D. F. Báez, J. H Zagal, S. Bollo, A. Toro-Labbé, R. Venegas, F. J. Recio "Reactivity descriptors for Cu bis-phenanthroline catalysts for the hydrogen peroxide reduction reaction" *Electrochim. Acta*, 357 (2020) 136881
6. J.H. Zagal "Electrochemistry, past, present, and future: energy conversion, sensors, and beyond". *J. Solid State Electrochem.*, 124 (2020) 2195-2197

7. R. Praats, M. Käärrik, A. Kikas, V. Kisand, J. Aruväli, P. Paiste, M. Merisalu, J. Leis, V. Sammelseg, J.H. Zagal, S. Holdcroft, N. Nakashima, K. Tammeveski, "Electrocatalytic oxygen reduction reaction on iron phthalocyanine-modified carbide-derived carbon/carbon nanotube composite electrocatalysts", *Electrochim. Acta*, 334 (2020) 135575.
8. R. Venegas, K. Muñoz-Becerra, C. Candia-Onfray, J.F. Marco, J.H. Zagal, F.J. Recio, "Experimental reactivity descriptors of M-N-C catalysts for the oxygen reduction reaction", *Electrochim. Acta* 332 (2020) 13534
9. M. Viera, J. Riquelme, C. Aliaga, J.F. Marco, W. Orellana, J.H. Zagal, F. Tasca, "Oxygen Reduction Reaction at Penta-Coordinated Co Phthalocyanines", *Frontiers in Chemistry* 8 (2020) 22.
10. C. Gutiérrez-Cerón, N. Silva, I. Ponce, J.H. Zagal, "Testing reactivity descriptors for the electrocatalytic activity of OPG hybrid electrodes modified with iron macrocyclic complexes and MWCNTs for the oxidation of reduced glutathione in basic medium.", *Russian J. Electrochem.*, 55 (2019) 1136-1143
11. N. Silva, C. Castro-Castillo, M.P. Oyarzún, S. Ramírez, C. Gutiérrez-Ceron, J.F. Marco, J.F. Silva, J.H. Zagal, "Modulation of the electrocatalytic activity of Fe phthalocyanine to carbon nanotubes: Electrochemistry of l-cysteine and l-cystine", *Electrochim. Acta* 308 (2019) 295-306
12. M. Gulppi, L. Muñoz, N. Vejar, J.M. Blamey, E. Gonzalez, M. Azócar, M. Sancy, P. Molina, J.H. Zagal, M. Paez, "Electrochemical dynamic sensing of hydrogen peroxide in the presence of microorganisms", *Electrochim. Acta* 305 (2019) 416-422
13. C. Zúñiga, C. Candia-Onfray, R. Venegas, K. Muñoz, J. Urra, M. Sánchez-Arenillas, J.F. Marco, J.H. Zagal, F.J. Recio, "Elucidating the mechanism of the oxygen reduction reaction for pyrolyzed Fe-NC catalysts in basic media", *Electrochem. Comm.*, 102 (2019) 78-82.
14. R. Praats, I. Kruusenberg, M. Käärrik, U.s Joost, J. Aruvälic, P. Paist, R. Saar, P. Rauwel, M. Kook, J. Leisa, J.H. Zagal, K. Tammeveski, "Electroreduction of oxygen in alkaline solution on iron phthalocyanine modified carbide-derived carbons", *Electrochim. Acta* 299 (2019) 999-1010
15. C. Gutiérrez-Ceron, R. Oñate, J.H. Zagal, A. Pizarro, J.F. Silva, C. Castro-Castillo, M. Caroli Rezende, M. Flores, D. Cortés-Arriagada, A. Toro-Labbé, L.M. Campos, L. Venkataraman, I. Ponce, "Molecular Conductance versus Inductive Effects from Axial Ligands on the Electrocatalytic Activity for the Reduction of Molecular Oxygen of Self-Assembled Iron Phthalocyanine", *Electrochim. Acta* 327 (2019) 134996
16. C. Zúñiga, C. Candia-Onfray, R. Venegas, K. Muñoz-Becerra, J. Urra, M. Sánchez-Arenillas, J. F. Marco, J. H. Zagal, F. J. Recio, "Elucidating the mechanism of the oxygen reduction reaction for pyrolyzed Fe-NC catalysts in basic media", *Electrochem. Comm.*, 102 (2019) 78-82.
17. N. Silva, C. Castro-Castillo, M.P. Oyarzún, S. Ramírez, C. Gutiérrez-Ceron, J.F. Marco, J.F. Silva, J.H. Zagal, Modulation of the electrocatalytic activity of Fe phthalocyanine to carbon nanotubes: Electrochemistry of l-cysteine and l-cystine, *Electrochimica Acta*, 308 (2019) 295-306
18. M. Gulppi, L. Muñoz, N. Vejar, J.M. Blamey, E. Gonzalez, M. Azócar, M. Sancy, P. Molina, J.H. Zagal, M. Paez, Electrochemical dynamic sensing of hydrogen peroxide in the presence of microorganisms, *Electrochimica Acta* 305 (2019) 416-422
19. R. Praats, I. Kruusenberg, M. Käärrik, U. Joost, J. Aruvälic, P. Paiste, R. Saar, P. Rauwel, M. Kook, J. Leisa, J. H. Zagal, K. Tammeveski, Electroreduction of oxygen in alkaline solution on iron phthalocyanine modified carbide-derived carbons, *Electrochimica Acta* 299 (2019) 999-1010.
20. A. Pizarro, G. Abarca, C. Gutiérrez-Cerón, D. Cortés-Arriagada, F. Bernardi, C. Berrios, J. F. Silva, M.C. Rezende, J. H. Zagal, R. Oñate, I. Ponce "Building Pyridinium Molecular Wires as Axial Ligands for Tuning the Electrocatalytic Activity of Iron Phthalocyanines for the Oxygen Reduction Reaction", *ACS Catalysis* 8 (2018) 8406-8419
21. L. Muñoz, L. Tamayo, M. Gulppi, F. Rabagliati, M. Flores, M. Urzúa, M. Azócar, J. H. Zagal, M. V Encinas, X. Zhou, G. Thompson, M. Páez "Surface functionalization of an aluminum alloy for generation of an antibiofilm coating based of poly(methyl methacrylate) and silver nanoparticles", *Molecules* 23 (2018) 2747
22. J. H. Zagal Editorial, "Tuning chemistry for better electrocatalysis", *Current Opinion in Electrochemistry* 9 (2018) A3-A4.
23. F. Bedioui, V. Lair, S. Griveau, A. Ringuedé, J.H. Zagal, M. Cassir "Electrochemical behavior of electrode materials (nickel and stainless steels) for sudomotor dysfunction applications: a review", *Electroanalysis* 30 (2018) 2525-2534
24. I. Kruusenberg, M. Kärrik, U. Joost, J. Aruväli, R. Saar, P. Rauwel, J. Leis, J.H. Zagal, K. Tammeveski "Electroreduction of Oxygen in Alkaline Solution on Iron Phthalocyanine Modified Carbide-Derived Carbons", R. Praats, *ACS Appl. Mater. Energy* 299 (2019) 999-1010
25. F. A. Gutierrez; E. Mazario; N. Menéndez; P. Herrasti; M. D. Rubianes; J. H. Zagal; C. Yañez; Gustavo A. Rivas; S. Bollo; F. J. Recio Electrocatalytic Activity of Nanohybrids Based on Carbon Nanomaterials and MFe₂O₄ (M=Co, Mn) Towards the Reduction of Hydrogen Peroxide", *Electroanalysis* 30 (2018) 1621-1626
26. K. Tammeveski, J. H. Zagal, "Electrocatalytic oxygen reduction on transition metal macrocyclic complexes for anion exchange membrane fuel cell applications", *Current Opinion Electrochemistry*, 9 (2018) 207-213
27. N. Silva, S. Calderón, M. A. Páez, M. P. Oyarzún, M. T.M. Koper, J. H. Zagal "Probing the Feⁿ⁺/Fe⁽ⁿ⁻¹⁾⁺ redox potential of Fe phthalocyanines as a reactivity descriptor in the electrochemical oxidation of Cysteamine", *J. Electroanal. Chem.*, 819 (2018) 502-510. (in honor of Roger Parsons)
28. J. Riquelme, K. Neira, J. F. Marco, P. Hermosilla, D. Venegas, W. Orellana, J. H. Zagal, F. Tasca, "Biomimicking Vitamin B12. A Co Phthalocyanine Pyridine Axial Ligand Coordinated Catalyst for the Oxygen Reduction Reaction", *Electrochim. Acta* 265 (2018) 547-555
29. F. Tasca, F.J. Recio, R. Venegas, D.A. Geraldo, M. Sancy, J.H. Zagal "Corrigendum to "Linear versus volcano correlations for the electrocatalytic oxidation of hydrazine on graphite electrodes modified with MN₄ macrocyclic complexes", *Electrochim. Acta*, 140 (2014) 314-319", *Electrochim. Acta*, 260 (2018) 994.

Candidate Statement

I have accepted been nominated for the election of Chair of the Division 6 for the period 2023-2024 and I am highly motivated to work and to continue to develop division 6. Molecular Electrochemistry is a central but broad and exciting discipline covering the electrochemical transformation of individual molecules, merging with many areas of electrochemistry and also with chemistry, biology and even physics. As a result there are considerable overlaps with other divisions and these overlaps should be encouraged by organizing symposia at Annual and Topical Meetings that bring together scientists from these different areas covered by molecular electrochemistry such as mechanistic studies involving small and complex molecules, mechanisms of catalysis, electrocatalysis , photocatalysis, bioprocesses, molecular understanding of sensor activity, molecular recognition, molecular electronics, just to mention a few. I plan to invite young and more experienced researchers to participate in our divisional meetings, to contribute with new ideas for choosing topics, possibly new topics and implementing ways of interaction with members of other divisions. It will be important to prepare broad divisional meetings at each Annual Meeting and also at topical meetings. I plan to encourage members of our division to publish their best work in the official ISE journal: *Electrochimica Acta* and encourage the proper organizers to propose to the Editors to publish Special Issues of *Electrochimica Acta* resulting from our symposia from both Annual and Topical Meetings. I plan to encourage officers and members of our Division and regional representatives to recruit new members, especially young scientists from different regions of the world to become members of ISE. It would be important to promote connections with other divisions and organize Topical Meetings as mentioned above. I want to promote the creation of a new Division Award: The "J.M.Saveant Award" for young scientists in memory of this outstanding electrochemist.