

CLAUDIO SUÁREZ-AUTHIÈVRE

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SUMMARY

Ph.D. Chem., B.Sc. Chem. with experience in academic teaching as well as scientific research in areas such as electrodeposition of metals, electrocatalysis, photoelectrochemistry of semiconductors and EIS(Electrochemical Impedance Spectroscopy) analysis – modeling. Similarly, Mrs. Suárez-Authièvre has gained experience in the last nine years in applied research concerning to Cooper electro – refining, molybdenite flotation, solar evaporation processes for Lithium and potassium brine, Lithium Carbonate – Potash process and non metallic processes modeling and simulation for companies in Chile, Canada, Ecuador and Argentine. Actually, Mrs. Suárez-Authièvre is owner of AUTHIEVRE CHEMICAL RESEARCH CONSULTING INC.

EDUCATION

Doctor's degree in Sciences mention Chemistry, Pontificia Universidad Católica de Valparaíso 2000 – 2004.

Thesis Title: Kinetic and Mechanistic Study of Oxygen Electroreduction on Rhenium Electrodes.

Brief synopsis of research:

This thesis was carried out to study and know the processes that take place during the oxygen electroreduction onto Rhenium electrode, using several electrochemical techniques as well as the Electrochemical Impedance Spectroscopy technique (EIS) where equivalent circuits and electrochemical reaction mechanisms function transfer model were proposed, developed and researched. The developed topics are related with the relevance associated to the oxygen electroreduction reaction in energy conversion devices for cold combustion and the research for the new electrocatalysts that replace the typical ones such as platinum, palladium and rhodium in the implementation of fuel cells devices.

Although these last elements show the best electrocatalyst properties for the oxygen electroreduction reaction, they are not very attractive to employ in fuel cells because their high cost. On the other hand, the Rhenium research for catalytic material application in oxygen electroreduction has not been studied until the development of this thesis and it represents an attractive alternative in the electrocatalytic technological development of new materials, as well as for their purely cognitive aspects.

Bachelor's degree in Chemistry, Pontificia Universidad Católica de Valparaíso 1993 – 1999.

WORK EXPERIENCE

2013 – present Scientific Research Consultant for Universidad Técnica de Machala (UTMACH). Ecuador – Canada

Topics of advisory:

1. Bibliographic analysis related to:
 - 1.1. Cyanide leaching gold recovery process
 - 1.2. Thiourea gold leaching process
 - 1.3. Leaching gold process:
 - 1.3.1. CIL/CIP process modeling
 - 1.3.2. Heap process modeling
 - 1.3.3. Kinetics study
 - 1.3.4. Bench study
 - 1.3.5. Pilot study
 - 1.4. Environmental impact of mining activity and remediation.
 - 1.5. Modeling electrolyte solution with the extended universal quasichemical (UNIQUAC) model.
2. Technical advice to create a Metallurgical Laboratory
3. Generate contact and/or strategic alliances between UTMACH, Mining Companies and Government entities.
4. Train teachers and students in technical mining issues.
5. Linked to the UTMACH with the Ministry of Renewable and no Renewable Natural Resources of Ecuador.
6. Advise the following research topics:
 - 6.1. Physicochemical study of Gold leaching, adsorption and desorption using cyanidation and thiourea methods. Technique comparison between both methods.
 - 6.2. Modeling and simulation of CIL/CIP gold leaching process. Technique – economic comparison between cyanidation and thiourea methods.
 - 6.3. Parameters study of column – simulated heap leach testing using cyanidation and thiourea methods .
 - 6.4. Modeling and simulation of Gold heap leach process. Technique – economic comparison between cyanidation and thiourea methods.
 - 6.5. Heavy metal removal study from gold industrial wastewater.
 - 6.6. Cyanide removal study from gold process wastewater using advanced oxidation method.

- 6.7. Thiourea removal study from gold process wastewater using advanced oxidation method.
7. Advise to improve the quality of the carrier in Faculty of Chemistry.

2011 – 2013.

Li process consultant and solar evaporation ponds for Lithium Americas Corp, Minera Exar (Argentina), Authievre Chemical Research Consulting Inc., Toronto, Canada.

Topics of advisory:

1. Review information about Lithium
2. Mathematical modeling of solar evaporation pond, impurities (Mg, Ca and B) remove and Li_2CO_3 process with gPROMS simulator.
3. Technical advice for 43101 Technical Reports
4. Design of experiments for pilot plan and scaling of process.
5. Clarify questions/explain the process to key company employees, investors and shareholders.
6. Advise in company presentations and information distributions to the public.
7. Process development advisor.
8. Li_2CO_3 process due diligent to Canada Lithium Corp.

2007 – 2010.

Process Researcher , SQM Salar – Litio SA, Antofagasta, Chile.

Research and development of new processes related with products based on Li and K:

1. Modeling, Simulation and Optimization of Processes at Lithium Carbonate Plant.
2. Development and implementation of a thermodynamic model of electrical conductivity, viscosity and density of lithium brines.
3. Modeling and Simulation of evaporation processes of high sulphates brines.
4. Magnesium removal from brines.
5. Development of strategic products
6. Process Contingency
7. Conceptual design and study of the alternative Lithium Hydroxide process.
8. Statistical Process Analysis and Plant Optimization

1997 – 2007.

Teaching and research. Pontificia Universidad Católica de Valparaíso, Chile.

Adjunct Professor 1997 – 2004



1. Kinetic and Thermodynamic of Chemical Processes
2. Physical Chemistry I
3. Physical Chemistry III
4. Analytical Chemistry I
5. Analytical Chemical Laboratory
6. Instrumental Analysis
7. Instrumental Analysis Laboratory
8. Chemical Process Simulations

Research Professor, (chair) 2005 – 2007

1. Chemical Processes in Mining Chilean Industries
2. Thermodynamic and Kinetic of Chemical Processes
3. Chemical Process Simulations

Academic Research, 2005 – 2007

1. Research Assistant in FONDEF project D03i1148. "DEVELOPMENT OF CONTROL SYSTEMS TO MONITOR AND PREVENT STRIATION FORMATION IN COPPER CATHODES OBTAINED IN ELECTROREFINING PLANTS". 2005.
2. Research Assistant in CODELCO, DIVISION TENIENTE Project, under contract 4500536871. 2005.
3. Research Assistant FONDECYT Project: 1040650. ELECTROSYNTHESIS OF NANOWIRES OF METALS, SEMICONDUCTORS AND HETEROSTRUCTURES OVER POROUS MEMBRANES: NUCLEATION/GROWING MECHANISM AND MODULATION OF PROPERTIES THROUGH CONTROLLING ELECTRODEPOSITION PARAMETERS. 2006 – 2007.

2006 – 2007

Teaching. Universidad Viña del Mar, Chile

Visiting Professor, (chair) 2006 – 2007

- General Chemistry

SKILLS

Skills to carry out *R&D* projects of diverse complexity and type.

Specific skills:

1. Computing skills:

- 1.1. Mathematical and statistical analysis programs: Matlab, Origin, Mathcad and JMP7.
- 1.2. C++
- 1.3. Dynamic Process Modeling: Gproms (PSE) and OLI Stream Analyzer.
- 1.4. Operating system: Windows.
- 1.5. Applications: Microsoft Office, Internet Explorer, Corel and email administrators.

2. Others:

- 2.1. Adaptability to different situations and outlined objectives
- 2.2. Knowledge of investigation methodologies
- 2.3. Writing and presentation of scientific reports
- 2.4. Ability to develop different mathematical scientific challengers.

3. Languages skills:

- 3.1. First language : Spanish
- 3.2. Second language : English
- 3.3. Third language : French (Basic level)

4. Status in Canada

Resident Permanent

SCHOLARSHIP

1. Doctoral scholarship CONICYT, 2000 - 2004
2. Doctoral thesis scholarship, 2004.

PUBLICATIONS

1. R. Schrebler, P. Cury, C. Suárez, E. Muñoz, H. Gómez, R. Córdova. *Journal of Electroanalytical Chemistry*, Vol 533, 167 – 175, 2002.
2. C. Suárez, E. Ahumada, F. Orellana, H. Hein, G. Cote, H. Lizama. *Journal of Chemical Technology and Biotechnology*, 77, 1 – 7, 2002.
3. E. Ahumada, H. Lizama, E. Fuentes, F. Orellana, C. Suárez. *Boletín de la Sociedad Chilena de Química*, 45, 415 – 422, 2000.
4. E. Ahumada, H. Lizama, F. Orellana, C. Suárez, A. Huidobro, A. Sepúlveda – Escribano, F. Rodríguez – Reinoso. *Carbon*, 40, 2827 – 2834, 2002
5. R. Schrebler, P. Cury, C. Suárez, E. Muñoz, F. Vera, H. Gómez, R. Córdova, J. R. Ramos – Barrado, D. Leinen, E. A. Dalchiele. *Thin Solid Films*, 483, 50 – 59, 2005.
6. F. Vera, R. Schrebler, E. Muñoz, C. Suarez, P. Cury, H. Gómez, R. Córdova, R.E. Marotti, E.A. Dalchiele. *Thin Solid Films*, 490, 182 – 188, 2005.
7. E. Muñoz, R. Schrebler, G. Riveros, R. del Río, P. Cury, C. Suárez, R. Córdova, H. Gómez., R. E. Marotti and E. A. Dalchiele. *Journal of Physical Chemistry B*. **110 (42)**, 21109 -21117, 2006.
8. E. C. Muñoz, R. Schrebler, P. Cury, C. Suárez, R. Córdova, R. E. Marotti and E A. Dalchiele. *Journal of Physical Chemistry C*. **111 (44)**, 16506-16515, 2007.
9. H. Gómez, H. Lizama, C. Suárez, A. Valenzuela. *J. Chil. Chem. Soc.*, 54, Nº 4, 439-444. 2009

PATENT

- Pérez, Waldo; **Suárez, Claudio**; Bravo, Marcelo; Barrientos, Hugo. (2013). CA 02762601. Canadian Intellectual Property Office.