

Stylios G. Neophytides

**CARICULUM
VITAE**

Stylios Neophytides
1-14-2021

Stylianos G. Neophytides

Foundation of Research and Technology Hellas (FORTH)

Institute of Chemical Engineering Sciences (ICE-HT)

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Date of Birth: 18 October, 1960

Place of Birth: Limasol, Cyprus

Place of residence: Charalabopoulou str. 35, Agios Vasilios, Rion, 26504 Patras

Marital Status: Married, three Children

Education

Diploma in Chemical Engineering

Department of Chemical Engineering, University of Patras, Greece, 1985

PhD in Chemical Engineering

Department of Chemical Engineering, University of Patras, Greece, 1990*

* I defended my PhD in July of 1988 and it was officially awarded on 16 January, 1990

Professional Experience

2007 – Today: FORTH/ICE-HT Research Director

2005 – 2010: Chairman of the board of directors of ADVENT Technologies S.A.

2002 – 2007: FORTH/ICE-HT Principal Researcher

1995 – 2002: FORTH/ICE-HT Associate Scientist

1991 – 1995: FORTH/ICE-HT Post Doctoral Fellow

1988 – 1991: Laboratory of Petochemical Techn., Univ. of Gent, Belgium – Post Doctoral Fellow

Research Interests

- Electrochemistry and electrochemical Engineering: Design and development of Pilot scale electrochemical reactors
- Fuel Cells (solid oxide, SOFCs and polymer electrolytes, PEM)
- PEM water electrolysis
- Photo-electrocatalytic water splitting and organics photoelectrooxidation
- Heterogeneous Catalysis
- Chemical Reaction Engineering
- Applications of Infrared and X-ray photoelectron spectroscopies in catalysis and electrocatalysis

OVERVIEW OF PUBLICATIONS

- In refereed international Journals: **149**
- Chapters in books: **5**
- In refereed special issues and refereed conference proceedings: **40**
- Patents: **5**
- **Total number of publications: 199**
- Invited Lectures: **29**
- Plenary lectures: **3**
- Oral presentations in international conferences: **102**
- Participation in Greek conferences: **57**

- total citation index: **4867**
- citation index without self-citations: **3533**
- h-index: **39**

Research Projects

- Project Coordinator: **16** (11 European, 5 National)
- Project participation Scientific leader: **13** (9 European, 3 National)
- Members of the research team: **5**
- Budget for my research group: **7,750,000 €**
- Total Budget: **28,000,000 €**

Participation in PhD defence committees

Participation in 28 PhD defence committees in Greece and abroad

- Department of Chemical Engineering, University of Patras
- Department of Chemistry, University of Patras
- General Department, University of Patras
- Department of Mechanical Engineering, University of Thessaly
- Department of Chemical Engineering Aristotele University of Thessaloniki
- Ecole doctorale des sciences chimiques, University of Strassburg
- Department of Inorganic Chemistry, University of Chemical Technology Prague

Reviewer of International Journals

I am reviewer in international scientific Journals related to electrochemistry, catalysis and chemical engineering. On the average, I review 10 articles per year for the Journals listed below:

- Science
- Journal of catalysis
- Electrochimica Acta
- Journal of Applied Electrochemistry
- Journal of solid state electrochemistry
- Journal of physical chemistry
- Journal of electrochemical society
- Electrochimica acta
- Catalysis today
- Chemical Engineering Science
- Applied catalysis
- Industrial Engineering and chemistry research
- Journal of polymer science

Proposals Reviewer

- Greek General Secretariat of research and technology
- Estonian Research Council, 2018
- Fuel Cell & H₂ Joint Undertaking (FCH 2 JU), 2018
- European Commission, H₂O₂-Spire programme, 2017
- ANR France 2016
- Swiss National Science Foundation, 2015
- DOE United states 2011

Membership of Professional Bodies and Associations

- **2019- : Member of the board of directors of the Hellenic Foundation of Research and Innovation (HFRI).**
- **2016- : Regional representative of Greece, International Society of Electrochemistry (ISE)**
- Greek Technical Society
- Hellenic Catalysis Society
- The Electrochemical Society (ECS)

Organization of conferences, summer schools and Scientific meetings

- 10/2004** **1st summer school in SOFC technology** , 80 participants, Patras Greece
- 09/2006** **3rd Summer School on SOFC technology**, 150 participants, Lemnos, Greece.
- 10/2010** **Summer School on Electrolytes for PEM Water Electrolysis**, 29 participants, Patras, Greece.
- 09/2015** **3rd International Workshop on Degradation issues of Fuel Cells and Electrolysers**, 130 participants, Santorini, Greece.
- 10/2016** **11th European Space Power Conference (ESPC 2016)**, Thessaloniki, Greece, 400 participants, member of the organizing committee.
- 2000-Today** Several **technical project meetings** within the framework of the research projects that I was coordinating, about 10-15 participants in each meeting.

Supervision of PhDs

PhDs already defended

1. Study of chemisorbed carbon species during the equilibrium of CH₄ dissociative adsorption on Ni based YSZ cermets.
2. The electrochemical promotion of Pt and PtRu supported on Zeolites and Carbon and the study of oxygen reduction electrocatalysts.
3. Synthesis, physicochemical characterization and electrochemical study of bimetallic and trimetallic electrocatalysts for PEM fuel cells.
4. Study of the physicochemical and electrocatalytic properties of metal - metal interphases formed by under potential deposition.
5. Development and study of polymer electrolytes for high temperature >100°C PEM fuel cells
6. Study and development of photosensitive electrodes for the photoelectrochemical dissociation of water.
7. Synthesis and study of bimetallic Ni based electrocatalysts with high tolerance to carbon deposition under CH₄ steam reforming partial oxidation conditions.
8. Anode degradation in SOFCs. Electrocatalysts development tolerant to carbon deposition and sulfur poisoning
9. Development of functionalized carbon nanotubes Pt electrocatalysts for high temperature PEM fuel cells. Study of the degradation mechanism.
10. Study of the electrocatalytic activity of Pt supported in atomic dispersion on modified carbon nanotubes
11. Study of the photoelectrochemical activity and stability of ZnO nanorods in contact with alkaline solutions of NaOH.

Ongoing PhDs

1. Physical mathematical modeling of electrochemical impedance spectra for the study of the electrokinetic mechanism of electrocatalytic reactions.

2. Development of electrocatalysts and electrodes for the electrochemical decomposition of water in high temperature solid oxide cells
3. Study of simultaneous / co - electrolysis of CO₂ and H₂O in high temperature solid oxide cells
4. The effect of modified carbon supports (graphene, carbon nanotubes) on the electronic and catalytic properties of Pt nanoparticles

Lectures

I. Invited Lectures

1. "Electrochemical Promotion in catalysis in liquid electrolyte cells", University of Poitiers, Poitiers, France, December, 1994.
2. 1st Greek conference in Green Chemistry, Athens, Greece, February 28-29, 2004.
3. "Catalysis and electrocatalysis in PEM fuel cells. Methodologies and experimentation", CONCENT meeting, Sofia, November 26-27, 2004.
4. "Fuel Cell research and development in Greece", 55th Annual Meeting of the
5. INTERNATIONAL SOCIETY OF ELECTROCHEMISTRY 19-24 September 2004, Thessaloniki, Greece
6. "Electrocatalysts development for PEM Fuel Cells", Chemical Process and energy resources Institute (CPERI), Thessaloniki, Greece February 4, 2005.
7. "Recent trends in Fuel Cell Catalysts Effect of Mo oxides and TiO₂ on the catalytic and electrocatalytic properties of Pt Symposium on High Temperature PEM Fuel Cells", Rio, Greece, September 13 - 14, 2005.
8. "Electrochemical Promotion and Electrochemical Metal Support Interaction: From Fundamentals to Monolithic Electropromoted Reactors", 4th European Summer School on Electrochemical Engineering, Palić, Serbia and Montenegro, September 17 – 22, 2006.
9. "Clean and efficient electricity production by the use of Fuel Cells", INNOREF-BRIE WORKSHOP, PATRAS, December 7-8, 2006.
10. "High Tolerant to Carbon Deposition Ni-based Electrodes under Internal Steam Reforming Conditions", TMS meeting, New Orleans, March 9-13, 2008.
11. "Proton conduction mechanism in H₃PO₄ imbibed Polymer electrolytes. The effect of water vapors", 8th European Conference in Electrochemical Engineering, Prague, 2008.
12. Proton conductivity in PEM Fuel Cells, IMPRS "Energy" summer school, Patras, Greece, 1-8 June, 2008
13. Novel MEAs for high temperature PEM fuel cells and proton conduction mechanism, 5th Chemical Engineering Conference for Collaborative Research in Eastern Mediterranean Countries, Cetraro CS, May 24-29, 2008
14. Electrochemical Metal Support Interactions. The role of electrochemical interface in the promotion of supported metal catalysts, 2nd International Conference on the Electrochemical Promotion of catalysis and its applications Oleron Island, France 29 Sept-3 Oct, 2008

15. "New high temperature polymer electrolytes and MEAs", Neophytides S.G., Kallitsis J., TEPOC, Almagro, Spain, November 24 - 26 (2009).
16. "The interaction of water vapors with phosphoric acid imbibed membranes", Fuel Cells GRC conference, July 26-31, 2009, Bryant University
17. Proton conduction mechanism in H₃PO₄ imbibed PEMs: The effect of chemical structure and Steam, 218th ECS fall meeting, 10-15 October, 2010 Las Vegas
18. High Temperature PEM Fuel Cells Materials and fundamentals, Joint European Summer School for Fuel Cell and Hydrogen Technology, Viterbo, Italy, August 22 – September 2, 2011.
19. High Temperature PEM Fuel Cells Materials and challenges, Joint European Summer School for Fuel Cell and Hydrogen Technology, LOW TEMPERATURE FUEL CELLS, Viterbo, Italy, August 22 –September 2, 2011.
20. FUNCTIONALIZED CARBON NANOTUBES AND ANODE DEGRADATION IN HIGH TEMPERATURE PEM FUEL CELLS, 19th Annual International Conference on Composites or Nano Engineering, ICCE-19, July 24-30, 2011 in Shanghai, China
21. "Increase in Pt utilization on Pyridine Modified Pt/CNTs for High Temperature PEM fuel cells", 10th ISE Spring Meeting, Perth, Australia, April 15 – 18, 2012.
22. "From innovative materials to processes and devices for high performance, self-sustained energy production. The case of high temperature polymer electrolyte fuel cells (HTPEMFCs)", ITE workshop, Heraklion, July 12 -13, 2013.
23. "Carbon and Sulfur tolerant anodes for SOFCs", Hydrogen days 2014, Prague, Czech Republic, April 2- 4, 2014.
24. "Energy efficient electricity production based High Temperature PEM Fuel Cells", Industrial Technologies 2014, Athens, Greece, April 9 - 11, 2014
25. "Regenerative PEM Fuel Cells", 11th International Conference on Nanosciences & Nanotechnologies – NN14, Porto Palace Conference Centre & Hotel, 8 - 11 July 2014 Thessaloniki, Greece
26. Au and Mo modified Carbon and Sulfur Tolerant anodes for SOFCs, CNRS and University of Strasbourg, Strasbourg, 24 March, 2016
27. The development of High Temperature Polymer Electrolyte Fuel Cells and their role in a sustainable energy system, Khalifa University, Abu Dhabi 3 April, 2016
28. High temperature PEM fuel cell systems for stationary and portable applications, Stylianos G. Neophytides, CARISMA 2017, 10-12 April, Newcastle
29. The role of fuel cells in a distributed energy production system, 7th Energy FORUM Patras 17 March, 2018

II. **Pleenary Lectures**

1. "Non-Faradaic Modification of Catalytic Activity", 'Modern trends in chemical kinetics and catalysis', Novosibirsk, Russia, November 21-23, 1995.
2. "Electrochemical testing and spectroscopic investigation of anode electrocatalysts", 5th International Conference of New Materials for Electrochemical Systems, Montreal, Canada, July 6 - 11, 2003.

3. Effect of Au and/or Mo doping on the development of carbon and sulfur tolerant anodes for SOFCs., 15th Panhellenic Symposium in Catalysis, 18-20 October, 2018, Ioannina, Greece

III. Keynote Lectures

1. "From basic research to new fuel cell technology", 55th Annual Meeting of the International Society of Electrochemistry, Thessaloniki, Greece, September 19 – 24, 2004.
2. "The role of catalysis and electrocatalysis towards the successful implementation of Fuel Cell technology", 8th PanHellenic Symposium on Catalysis, Cyprus, October 30 – November 1, 2004.
3. "Interfacing Surface Catalysis and Electrocatalysis for the Successful Implementation of PEM Fuel Cells: The case of PtMo catalysts", Physical Chemistry 2006, Belgrade, September 26 – 29, 2006.
4. "Electrochemical Metal Support Interactions. The role of electrochemical interface in the promotion of supported metal catalysts", 2nd International Conference on the Electrochemical Promotion of catalysis and its applications, Oleron Island, France, 29 September 29 - October 3, 2008.
5. "Proton conduction mechanism in H₃PO₄ imbibed PEMs: The effect of chemical structure and Steam", 218th ECS fall meeting, Las Vegas, USA, October 10 - 15, 2010.
6. Regenerative PEM Fuel Cells, Stylianos G. Neophytides, 11th International Conference on Nanosciences & Nanotechnologies – NN14 Porto Palace Conference Centre & Hotel, 8 - 11 July 2014 Thessaloniki, Greece

Spin-offs

Participation in the establishment of ADVENT Technologies SA.

I was one of the key founders of ADVENT Technologies SA. The company was founded in November 2004 and was co-financed within the framework of the PRAXE program from the Greek Ministry of Development, with a shared cost action of 700,000 €. ADVENT Technologies SA was established in Patras Greece in November 2004 and I used to chair the company from 2005-2010. In 2010 ADVENT expanded its activities to Connecticut in the USA. The activities of the company focus on the optimization and commercialization of high temperature polymer electrolyte fuel cell technology, based on materials and processes that were developed at FORTH/ICE-HT and the Department of Chemistry of the University of Patras. The company is currently specialized in the development of high temperature PEM fuel cell stacks based on its proprietary technology.

Participation in Research & Development Projects

I. Coordination of national and European research projects (16 projects)

- 1998 - 2000 **Advances in electrocatalysis and catalysis for contemporary important electrode and heterogeneous chemical processes leading to renewable and sustainable energy and fuels**
Funding organization: Ministry of Development, Joint research and technology programs between Greece and Yugoslavia
Contract No.: 3143/26.2.99 (Bilateral Cooperation)
Budget: 11.000 EURO
Duration: 1998 - 2001
- 1999-2001 **Development of novel composite ceramic materials for solid oxide fuel cells (Coordinator)**
Funding organization: Greek Ministry of Development, ΠΕΝΕΔ 99
Contract No.: 99ΕΔ-557
Budget: 155.000 EURO
Duration: 2000 - 2001
- 2000-2003 **Natural gas fuelled solid oxide fuel cells (SOFCs) for cogeneration of electricity and chemicals (Coordinator)**
Acronym: NG-SOFC-CO
Funding organization: European Commission, INCO2-COPERNICOUS2
Contract No.: ICA2-CT-2000-10030
Budget: 180.000 EURO
Duration: 2000 - 2003
- 2001-2004 **“Advanced PEM fuel cells” (Coordinator)**
Acronym: APOLLON
Funding organization: European Commission, EESD Program Contract No.: NNE5-2001-00187
Budget: 600.000 kEURO
Duration: 2001 - 2005
- 2002-2005 **Membrane Cell Hydrogen Generator and Electrocatalysis for Water Splitting (Coordinator)**
Funding organization: European Commission, INCO-COPERNICOUS-BALKANS
Contract No.: ICA2-CT-2002-10001
Budget: 238.000 EURO
Duration: 2002 - 2006
- 2005-2008 **Development of nanostructured electrodes and electrolytes for solid oxide fuel cells (Coordinator)**
Funding organization: Ministry of Development, ΠΕΝΕΔ 2003
Contract No.: 03-ED-505
Budget: 38 605 EURO
Duration: 2005 - 2009
- 2006-2009 **Polymer Electrolytes and Non Noble Metal Electrocatalysts for High Temperature PEM Fuel Cells (Coordinator)**
Acronym: APOLLON-B

Funding organization: European Commission
Contract nr.: ENG2-CT2002-20652
Budget: 604.992 EURO
Duration: 2006 - 2009

2010-2013 **Understanding the Degradation Mechanisms of Membrane-Electrode-Assembly for High Temperature PEMFCs and Optimization of the Individual Components (Coordinator)**

Acronym: DEMMEA
Funding organization: European Commission FCH-JU
Contract No: 245156
Budget: 400.000€
Duration: 36 months

2013-2016 **Development of a portable internal reforming methanol high temperature PEM Fuel Cell (Coordinator)**

Acronym: IRMFC
Contract No: 325358
Funding organization: European Commission FCH-JU
Budget: 310.000 EURO
Duration: 2013 - 2016

2013-2016 **Understanding the Degradation Mechanisms of a High Temperature PEMFC Stack and Optimization of the Individual Components (Coordinator)**

Acronym: DEMSTACK
Contract No: 325368
Funding organization: European Commission FCH-JU
Budget: 300.000 EURO
Duration 2013 – 2016

2014-2017 **Development of a Closed Loop Regenerative HT PEM Fuel Cell System (Coordinator)**

Acronym: Regenerative fuel cell
Contract No: European Space Agency (ESA) Contract No. 4000109578/13/NL/SC
Funding organization: European Space Agency
Budget: 1.000.000 EURO
Duration 2014 - 2017

2015-2019 **Development of new electrode materials and understanding of degradation mechanisms on Solid Oxide High Temperature Electrolysis Cells. (Coordinator)**

Acronym: SElySOs
Contract No: 671481

Funding organization: European Commission FCH-JU
Budget: 500.000 EURO
Duration 2015 – 2019

- 2020-2023 **Next Generation solid oxide fuel cell and electrolysis technology**
ACRONYM: “NewSOC”
Contract number No: 874577.
Funding organization: European Commission FCH-JU
Budget: 300.000 EURO
Duration 2020 – 2023
- 2018-2020 **Advanced electrocatalysts and electrodes for PEM fuel cells for energy applications.**
Acronym: ADEL4PEM
Funding Organization: Περιφέρεια Δυτικής Ελλάδας
Budget: 90.900 EURO
Duration: 2018-2020
- 2020-2023 **Development and demonstration at pilot scale of an innovative, efficient and environmentally friendly process for H2 and electricity production from biogas.**
Acronym: Eco-Bio-H2-FCs
Contract No: T2EΔK-00955
Funding organization: Greek general secretarial for research and development
Budget: 150.000 EURO
Duration 2020 – 2023
- 2020-2023 **Autonomous system of a regenerative fuel cell based on renewable energy sources.**
Acronym: Solar2HyP
Contract No: T2EΔK-01877
Funding organization: Greek general secretarial for research and development
Budget: 316,000 EURO
Duration 2020 – 2023

II. Scientific leader in national and European collaborative research projects

- 2002-2005 **Thematic network on Solid Oxide Fuel Cell Technology (SOFC NET)**
Funding organization: European Commission
Contract nr.: ENG2-CT2002-20652
Budget: 9 kEURO
Duration: 2003 - 2005
- 2004-2008 **Realising Reliable, Durable, Energy Efficient and Cost Effective SOFC systems**
Acronym: REAL-SOFC

Funding organization: European Commission
Contract No.: SES6-CT-2003-502612
Budget: 450.000 EURO
Duration: 2004 - 2008

2005-2008 **Development of photocatalytic and photoelectrochemical cells for the water dissociation by the use of sunlight**

Funding organization: Ministry of Development, PENED 2003
Contract No.: 03-ED-607
Budget: 44.333 EURO
Duration: 2005 - 2009

2006-2009 **Novel Materials for Silicate-Based Fuel Cells**

Acronym: MatSILC
Funding organization: European Commission
Contract No.: NMP3-CT2006-033410
Budget: 394.999 EURO
Duration: 2008 - 2009

2006-2009 **"Development of a Bioelectrochemical Device for CNS Repair"**

ACRONYM: NERBIOS
Funding organization: European Commission
Contract nr.: 28473
Budget: 300.000€
Duration 36 months

2010-2013 **"Understanding and minimizing anode degradation in hydrogen and natural gas fuelled SOFCs,**

ACRONYM : ROBANODE
Funding organization: European Commission FCH-JU
Budget: 310.000€
Duration: 36 months

2010-2013 **"Development of an Internal Reforming Alcohol High Temperature PEM Fuel Cell Stack"**

ACRONYM: ***IR AFC***
Contract No: 245202
Funding organization: European Commission FCH-JU
Budget: 310.000€
Contribution: 350.000 €
Duration: 36 months

2010-2013 **"Sustainable Hydrogen Generation"**

ACRONYM: **SusHGEN**
Contract No: 238678
Funding organization: European Commission Marie Curie
Budget: 1.736.940 EURO
Duration 48 months

2012-2015 **"Innovative SOFC Architecture based on Triode Operation"**

Acronym: T-Cell

Contract No: 298300
Funding organization: European Commission FCH-JU
Budget: 3.424.168 EURO
Duration: 2012 - 2015

2013-2016 **“Novel Catalyst materials for the cathode side of MEAs suitable for transportation applications”**

Acronym: CathCat
Contract No: 303492
Funding organization: European Commission FCH JU
Budget: 176.000 EURO
Duration 2013 – 2015

2013-2016 **“Development of innovative photo-fuel cells for hydrogen production and electricity based on the photo electro reforming of organic compounds”**

Acronym:Thalis
Funding organization: Greek Ministry of education GSRT
Budget: 600.000 EURO
Duration 2013 – 2015

III. Participation in research projects

1990-1995 **Fundamental studies of non-faradaic catalysis**

Funding organization: European Commission, SCIENCE program
Contr. No.: SCI*-CT90-0533
Budget: 192 kEURO
Duration: 1991 - 1994

1992-1995 **Integration techniques for up-scaled sofc modules (sofc integration)**

Funding organization: European Commission, SCIENCE program
Contr. No.: J0U2-CT92-0016
Budget: 2630 kEURO
Duration: 1992 - 1995

1994-1995 **"Internal reforming of natural gas (methane) in solid oxide fuel cells and catalytic and electrocatalytic performance of the anode"**

Funding organization: Ministry of development PENED 95
Contr. No.: AA2004
Budget 24,000 €

2003-2007 **PEM Fuel Cell Electricity Generator Operating on Methanol**

Funding organization: Ministry of Development, ΕΠΑΝ Ε25
Contract No.: Ε 25
Budget: 219 kEURO €
Duration: 2003 - 2007