CONSTANTINOS G. VAYENAS

Curriculum Vitae

Professor Emeritus, University of Patras
Honorary Professor, Aristotle University of Thessaloniki
Member, Academy of Athens, Division of Natural Sciences
International Member, NAE, USA

Born: September 22, 1950 in Athens, Greece

Current address: Laboratory of Chemical & Electrochemical Processes (LCEP), Dept. of Chemical Engineering, 1, Caratheodory St., University of Patras, GR-26504 Patras, Greece,
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http://www.nemca-chemeng.gr/ ; http://www.chemeng.upatras.gr/
& Division of Natural Sciences, Academy of Athens, Panepistimiou 28, Ave., GR-10679 Athens

Education:

Diploma in Chemical Engineering, NTU Athens, 1973
PhD, University of Rochester, USA, 1976

Professional Experience:

Teaching and Research Assistant, University of Rochester, 9/1/73-9/1/76
Assistant Professor of Engineering and Applied Science, Yale University, 9/1/76-9/1/77
Assistant Professor of Chemical Engineering, M.I.T., 9/1/77-9/1/78
Dupont Assistant Professor of Chemical Engineering, M.I.T., 9/1/78-6/1/80
J.R. Mares Assistant Professor of Chemical Engineering, M.I.T., 6/1/80-6/1/81
Associate Professor of Chemical Engineering, M.I.T. 6/1/81-6/1/83
Professor of Chemical Engineering, University of Patras, Greece, 1981-present
Alexander von Humboldt Fellow, University of Karlsruhe, 1991
Visiting Professor, Yale University, 1991-92
Invited Professor, EPFL, Lausanne, 1994
Invited Professor, Université de Lyon, 2007

Administrative Experience:

Dean of Engineering, University of Patras, 1983-85
Chairman of Chemical Engineering, University of Patras 1986-89 and 1993-95
Vice-President of DIKATSA (Hellenic Bureau for recognizing the equivalence of foreign academic degrees), 1988-89
Vice-Director, ICE/HT, 1985-87 & 1989-91
Vice-President, National Hellenic Research Foundation, EIE, 1994-1995
President, National Hellenic Research Foundation, 1995-1996
President of the Hellenic Catalysis Society, 1993-1995
Vice-Rector, University of Patras, 1997-2003
Member of the European Science and Technology Assembly (ESTA), 1997-2000
Secretary and Treasurer of the International Society for Solid State Ionics, 1998-2000
Member and Vice President of the National Research Council of Greece, 2001-2004
Chairman of Division 5, ISE, 2007
Member, Academy of Athens, Chair of Chemical Sciences, 2010 -

Research Interests:

a. In Physical Chemistry

Electrochemistry, electrocatalysis, heterogeneous catalysis, promotion, electrochemical promotion of catalysis, fuel cells, chemical cogeneration in fuel cells, chemical and electrochemical kinetics and reaction engineering.

b. In Physics

Gravity, Special Relativity, Thermodynamics of Elementary Particles, Rotating Lepton Model, Thermodynamics and Catalysis of Baryogenesis, Mass generation via Gravitational Confinement of Neutrinos, proton tunnelling, mathematical modelling of chemical and physical systems

Main Awards/Honors:

Member of the National Academy of Engineering, NAE, USA, 2017
Special Issue of Topics in Catalysis: Heterogeneous Catalysis and Electrochemistry, dedicated to Professor Constantinos G. Vayenas, 2015
Honorary Doctorate Degree, Aristotle University of Thessaloniki, 2015
Member of the Academy of Athens, 2010 -
Fellow of the International Society of Electrochemistry (ISE) 2005
Outstanding achievement Award of the High Temperature Division of the Electrochemical Society, 1996
Empirikion Foundation Award in Chemistry, 1994
Academy of Athens Award in Chemistry, 1992
Wason Medal for Materials Research, American Concrete Institute, 1992
Alexander von Humboldt Fellowship, 1990
B.F. Dodge Lecture, Yale University, 1989, 2005
H. and C. Dreyfus Teacher-Scholar Award, 1981
Outstanding Faculty Award, Dept. of Chemical Engineering, M.I.T. 1979 & 1981
E.H. Hooker Fellowship, University of Rochester, 1975
Greek State Prize for highest average in the National Technical University, 1972
Greek State Fellowship, (IKY) 1969-73
Greek State Fellowship (IKY) for 2nd highest average in the entrance examination of the National Technical University, 1st in Chemical Engineering, 1968
Praise of the Hellenic Mathematics Association, 1968

Editorships:

Modern Aspects of Electrochemistry, Editor, 2001-
Ionics, Associate Editor, 1999-2004
Solid State Ionics, Guest Editor, 1999-2000
Topics in Catalysis, Guest Editor, 2006-2007
Journal of Applied Electrochemistry, Guest Editor, 2007
Catalysis Today, Guest Editor, 2009

Memberships of Editorial Boards:

Topics in Catalysis
Catalysis Letters
Ionics
Journal of New Materials for Electrochemical Systems
Chemical Industry
ChemElectroChem

Organization of International Conferences:

Member of the organizing or advisory committee of:

1st Panhellenic Catalysis Symposium, Patras 1987
2nd Panhellenic Catalysis Symposium, Patras 1989
2nd International Conference on Solid Oxide Fuel Cells, Athens, 1991, Conference co-Chairman
1st International Conference on Electrocatalysis, Ferrara 1993
1st Euroconference on Solid State Ionics, Zakynthos 1994
2nd Euroconference on Solid State Ionics, Portugal 1995
4th Panhellenic Catalysis Symposium, Papingo 1995
3rd Euroconference on Solid State Ionics, Sardinia 1996
192nd Annual Meeting of the Electrochemical Society, Paris, 1997
4th International Conference on Spillover, Dalian, China, 1997
3rd World Congress on Oxidation Catalysis, San Diego, USA, 1997
12th International Conference on Solid State Ionics, Chalkidiki, Greece, 1999, Conference Chairman
50th International Society of Electrochemistry, (ISE) Meeting, Pavia, Italy, 1999
3rd International Symposium on Electrocatalysis, Portoroz, Slovenia, 2000
12th International Congress on Catalysis, Granada, Spain, 2000
55th International Society of Electrochemistry (ISE) Meeting Thessaloniki, 2004
19th North American Catalysis Conference, Philadelphia, 2005

Funded Research: ~8,000,000 Euro

Refereed Publications in Journals: 277 (of which 4 in Science and Nature)

Books authored: 3, including "*Electrochemical Activation of Catalysis: Promotion, Electrochemical Promotion and Metal-Support Interactions*" C.G. Vayenas, S. Bebelis, C. Pliangos, S. Brosda, and D. Tsiplakides, Kluwer/Plenum Press, New York (2001) and *"Gravity, special relativity and the strong force: A Bohr-Einstein-de Broglie model for the formation of hadrons"*, C.G. Vayenas, S.N.-A. Souentie, Springer, New York, (2012).

Books edited: 8, including "*Catalysis and Electrocatalysis at Nanoparticles Surfaces*" (A. Wieckowski, E. Savinova & C.G. Vayenas, eds.), Marcel Dekker Inc., New York - Basel (2003).

Chapters in Books: 12

International Patents: 12

Citations by others: ~ 9,442 (27.10.2020, ISI Web of Science)

Citations: 16803 (scholar google)

h-index: 54 (ISI Web of Science), 66 (Scholar google)

Invited Seminars in Universities and Research Centers: 111

Plenary, Keynote, Award and Invited Lectures in International Conferences: 78

PhD students supervised: 38 (18 in Academia)

PUBLICATIONS

A. IN REFEREED JOURNALS

1979

J1. "Chemistry at Catalyst Surfaces: The Oxidation of SO_2 on noble metals", C.G. Vayenas and H.M. Saltsburg, *J. Catal.* **57**, 296-314 (1979)

1980

J2. "Solid Electrolyte Aided Study of the Oxidation of Ethylene Oxide on Silver", M. Stoukides and C.G. Vayenas, *J. Catal.* **64**, 18-28 (1980)

J3. "Kinetics, Limit Cycles and Mechanism of Ethylene Oxidation on Pt", C.G. Vayenas, B. Lee and J. Michaels, *J. Catal.* **66**, 36-48 (1980)

J4. "Cogeneration of Electric Energy and Nitric Oxide", C.G. Vayenas and R.D. Farr, *Science* **208**, 593-595 (1980)

J5. "Ammonia High Temperature Solid Electrolyte Fuel Cell", R.D. Farr and C.G. Vayenas, *J. Electrochem. Soc.* **127**, 1478-1483 (1980)

1981

J6. "The role of PtO_x in the isothermal rate and oxygen activity oscillations of the Ethylene Oxidation on Pt", C.G. Vayenas, C.Georgakis, J. Michaels and J. Tormo, *J. Catal.* **67**, 348-361 (1981)

J7. "Solid Electrolyte-Aided Study of the Ethylene Oxidation on Polycrystalline Silver", M. Stoukides and C.G. Vayenas, *J. Catal.* **69**, 18-31 (1981)

J8. "The effect of Electrochemical Oxygen Pumping on the Rate and Selectivity of Ethylene Oxidation on Polycrystalline Silver", M. Stoukides and C.G. Vayenas, *J. Catal.* **70**, 137-146 (1981)

J9. "The effect of Homogeneous Gas Phase Oxidations in Char Particle Gasification", R. Cwiklinski, C.G. Vayenas, C. Georgakis and J. Wei, *Chem. Eng. Science* **36 (12)**, 1883-1896 (1981)

J10. "Ammonia Oxidation to Nitric Oxide in a Solid Electrolyte Fuel Cell", C. Sigal and C.G. Vayenas, *Solid State Ionics* **5**, 567-570 (1981)

1982

J11. "Kinetics and Rate Oscillations of the oxidation of Propylene Oxide on Silver", M. Stoukides and C.G. Vayenas, *J. Catal.* **74**, 266-274 (1982)

J12. "Response to Comments on the Model of Isothermal Oscillations of Ethylene Oxidation on Pt", C.G. Vayenas, C. Georgakis, and J.Michaels, *J. Catal.* **73**, 201-204 (1982)

J13. "On the Stability Limit of Surface Platinum Oxide and its role in the oscillatory behavior of Platinum Catalyzed Oxidations", C.G.Vayenas and J. Michaels, *Surface Science* **120**, L405-L408 (1982)

1983

J14. "Steady State Analysis of High Temperature Fuel Cells", P.G. Debenedetti and C.G.Vayenas, *Chem. Engin. Sci.* **38(11)**, 1817-1829 (1983)

J15. "Solid Electrolyte Aided-Study of Propylene Oxidation on Polycrystalline Silver", M. Stoukides and C.G. Vayenas, *J. Catal.* **82**, 45-55 (1983)

1984

J16. "Electrocatalytic Rate Enhancement of Propylene Epoxidation on Porous Silver Electrodes Using a Zirconia Oxygen Pump", M. Stoukides and C.G. Vayenas, *J. Electrochem. Soc.* **131**(4), 839-845 (1984)

J17. "Kinetics of Vapor-Phase Electrochemical Oxidative Dehydrogenation of Ethylbenzene", J.N. Michaels and C.G. Vayenas, *J. Catalysis* **85**, 477-487 (1984)

J18. "Styrene Production from Ethylbenzene on Platinun in a zirconia Electrochemical Reactor", J.N. Michaels and C.G. Vayenas, *J. Electrochem. Soc.* **131**(11), 2544-2550 (1984)

J19. "Comment on the "Interpretation of the Electromotive Forces of Solid Electrolyte Concentration Cells during CO oxidation on Platinum" and on "Electromotive-Forces Studies of CO oxidation on Platinum", C.G. Vayenas, *J. Catalysis* **90**, 371-373 (1984)

1985

J20. "Cross-Flow Solid-State Electrochemical Reactors: A steady-state Analysis", C.G. Vayenas, P.G. Debenedetti, Y. Yentekakis and L.L. Hegedus, *Ind. & Eng. Chem. Fundamentals* **24**, 316-324 (1985)

1986

J21. "Optimal Residence Time Distribution for Product Yield Maximization in Chemical Reactors", V. Nestoridis, I. Andreou and C.G. Vayenas, *J. of Optimization Theory and Applications (JOTA)* **49**(2), 271-287 (1986)

J22. "A Novel Cross-Flow Design for Solid State Electrochemical Reactors", J.N. Michaels, C.G. Vayenas and L.L. Hegedus, *J. Electrochem. Soc.* **133**(3), 522-525 (1986)

1987

J23. "Effectiveness Factors for reactions between volatile and non-volatile components in partially wetted catalysts", I. Yentekakis and C.G. Vayenas, *Chem. Engng. Science* **42**(6), 1323-1332 (1987)

J24. "Optimal Catalyst Distribution and Generalized Effectiveness Factors in Pellets: Single Reactions with Arbitrary kinetics", C.G. Vayenas and S. Pavlou, *Chem. Engng. Science* **42**(11), 2633-2645 (1987)

J25. "Optimal Catalyst Distribution for Selectivity Maximization in Pellets: Parallel and Consecutive Reactions", C.G. Vayenas and S. Pavlou, *Chem. Engng. Science* **42**(7), 1655-1666 (1987)

J26. "Optimal Catalyst Distribution in Pellets with Shell Progressive Poisoning", T. Bacaros, S. Bebelis, S. Pavlou and C.G. Vayenas in "Catalyst Deactivation 1987", P. Delmon, G.F. Froment (eds) "Studies in Surface Science and Catalysis", Elsevier, Amsterdam, **34**, 459-468 (1987)

1988

J27. "Optimal Catalyst Distribution for Selectivity Maximization in Nonisothermal Pellets: The case of Parallel Reactions", C.G. Vayenas and S. Pavlou, *Chem. Engng. Science* **43**(10), 2729-2740 (1988)

J28. "Solid Electrolyte Aided Study of the Mechanism of CO oxidation on Polycrystalline Platinum", I.V. Yentekakis, S. Neophytides and C.G. Vayenas, *J. Catalysis* **111**, 152-169 (1988)

J29. "The Effect of Electrochemical O^{2-} Pumping on the Steady State and Oscillatory Behavior of CO oxidation on Polycrystalline Pt", I.V. Yentekakis and C.G. Vayenas, *J. Catalysis* **111**, 170-188 (1988)

J30. "Catalytic and Electrocatalytic Reactions in Solid Oxide Fuel Cells", C.G. Vayenas, *Solid State Ionics*, Review Paper, **28-30**, 1521-1539 (1988)

J31. "Non-Faradaic Electrochemical Modification of Catalytic Activity",C.G. Vayenas, S. Bebelis and S. Neophytides, *J. Phys. Chem*. **92**, 5083-5085 (1988)

J32. "Mathematical Modelling of SLC Precalciners", S. Kolifetis and C.G. Vayenas, *ZKG (Zement-Kalk-Gypsum) International* **41(11)**, 559-563 (1988)

1989

J33. "Optimal Catalyst Distribution for Selectivity Maximization in Nonisothermal Pellets: The Case of Consecutive Reactions", C.G. Vayenas, S. Pavlou and A. Pappas, *Chem. Engng. Science* **44**(1), 133-145 (1989)

J34. "Non-Faradaic Electrochemical Modification of Catalytic Activity: 1. The case of Ethylene Oxidation on Pt", S. Bebelis and C.G. Vayenas, *J. Catalysis* **118**, 125-146 (1989)

J35. "Non-Faradaic Electrochemical Modification of Catalytic Activity: 2. The case of Methanol Dehydrogenation and Decomposition on Ag", S. Neophytides and C.G. Vayenas, *J. Catalysis* **118**, 147-163 (1989)

J36. "Chemical Cogeneration in Solid Oxide Fuel Cells: The Oxidation of H_2S to SO_2", I.V. Yentekakis and C.G. Vayenas, *J. Electrochem. Soc.* **136**, 996-1002 (1989)

J37. "Feste Ionenleiter in der Heterogene Katalyse", H.-G. Lintz and C.G. Vayenas, (review paper) *Angewande Chemie* **101**(6), 725-732 (1989)

J38. "Solid Ion Conductors in Heterogeneous Catalysis", H.-G. Lintz and C.G. Vayenas (review paper) *Angewandte Chemie Intern. Ed. in Engl.* **28**(6), 708-715 (1989)

J39. "In Situ High Temperature SERS on Ag Catalysts and Electrodes during Ethylene Epoxidation", S. Boghosian, S. Bebelis, C.G. Vayenas and G.N. Papatheodorou, *J. Catal.* **117**, 561-565 (1989)

J40. "Non-Faradaic Electrochemical Modification of Catalytic Activity in Solid Electrolyte Cells", C.G. Vayenas, S. Bebelis, S. Neophytides and I.V. Yentekakis, *Applied Physics (A)* **49**, 95-103 (1989)

J41. "A Reaction Engineering Approach to the Problem of Concrete Carbonation", V. Papadakis, C.G. Vayenas and M.N. Fardis, *AIChE J.* **35(10)**, 1639-1650 (1989)

1990

J42. "Chemical Cogeneration in Solid Electrolyte Cells: The Oxidation of CH_3OH to H_2CO", S. Neophytides and C.G. Vayenas, *J. Electrochem. Soc.* **137(3)**, 839-845 (1990)

J43. "Optimal Catalyst Activity Profile in pellets with Shell-progressive Poisoning: The case of fast linear kinetics", S. Pavlou and C.G. Vayenas, *Chem. Engng. Science* **45(3)**, 695-703 (1990)

J44. "Optimal Catalyst Activity Distribution for Selectivity Maximization in Triangular Reaction Networks: Application to the cases of Oxidative Coupling of CH_4 and Epoxidation of C_2H_4", S. Pavlou and C.G. Vayenas, *J. Catal.* **122**, 389-405(1990)

J45. "The Dependence of Catalytic Activity on Catalyst Work Function", C.G. Vayenas, S. Bebelis and S. Ladas, *Nature* **343**, 625-627 (1990)

J46. "Non-Faradaic Electrochemical Modification of Catalytic Activity on Pt Metals" C.G. Vayenas, S. Bebelis, I.V. Yentekakis, P. Tsiakaras and H. Karasali, *Plat. Met. Rev*. **34(3)**, 122-130 (1990)

J47. "Non-Faradaic Electrochemical Modification of Catalytic Activity: Partial Oxidation of C_2H_4 on Ag and CH_3OH on Pt", C.G. Vayenas, S. Bebelis and S. Neophytides in "New Developments in Selective Oxidation" G. Centi and F. Trifiro Ed., *"Studies in Surface Science and Catalysis"* **55**, pp. 643-652, Elsevier, Amsterdam (1990)

1991

J48. "Non-Faradaic Electrochemical Modification of Catalytic Activity: 3. The Case of Methanol Oxidation on Pt", C.G. Vayenas and S. Neophytides, *J. Catalysis* **127**, 645-664 (1991)

J49. "Physical and Chemical Characteristics Affecting the Durability of Concretes", V.G. Papadakis, M.N. Fardis and C.G. Vayenas, *ACI Materials J.* **88**(2), 186-196 (1991)

J50. "Experimental investigation and Mathematical modeling of the concrete carbonation problem", V.G. Papadakis, C.G. Vayenas and M.N. Fardis, *Chem. Engng. Sci.* **46** (5/6), 1333-1338 (1991)

J51. "Oxidative Coupling of Methane over Yttria-doped Zirconia Solid Electrolyte", S. Seimanides, P. Tsiakaras, X.E. Verykios and C.G. Vayenas, *Appl. Catalysis* **68**, 41-53 (1991)

J52. "Fundamental Modeling and Experimental Investigation of Concrete Carbonation", V. Papadakis, C.G. Vayenas and M.N. Fardis, *ACI Materials J.* **88**(4), 363-373 (1991)

J53. "Non-Faradaic Electrochemical Modification of Catalytic Activity: 4. The use of β''-Al_2O_3 as the solid electrolyte", C.G. Vayenas, S. Bebelis and S. Despotopoulou, *J. Catalysis* **128**, 415-435 (1991)

J54. "Solid Electrolyte Cyclic Voltammetry for in situ Investigation of Catalyst Surfaces", C.G. Vayenas, A. Ioannides and S. Bebelis, *J. Catalysis* **129**, 67-87 (1991)

J55. "Solid Electrolytes and Catalysis. Part 1: Chemical Cogeneration", C.G. Vayenas, S. Bebelis and C. Kyriazis, *Chemtech* **21**, 422-428 (1991)

J56. "Solid Electrolytes and Catalysis. Part 2: Non-Faradaic Catalysis", C.G. Vayenas, S. Bebelis and C. Kyriazis, *Chemtech* **21**, 500-505 (1991)

J57. "Comment on the "Optimal catalyst activity profiles in pellets-VIII. General nonisothermal reacting systems with arbitrary kinetics", S. Pavlou, C.G. Vayenas and G. Dassios, *Chem. Eng. Science* **46**(12), 3327-3328 (1991)

J58. "Work Function Measurements on Catalyst Films subject to in-situ Electrochemical Promotion", S. Ladas, S. Bebelis and C.G. Vayenas, *Surface Science* **251/252**, 1062-1069 (1991)

J59. "Solid Electrolytes for in situ Promotion of Catalyst Surfaces: The NEMCA effect", C.G. Vayenas, S. Bebelis, I.V. Yentekakis, P. Tsiakaras, H. Karasali and Ch. Karavasilis, *ISSI Letters* **2**, 5-7 (1991)

J60. "Kinetics of sulfation of Limestone and precalcined Limestone", D. Spartinos and C.G. Vayenas, *Chem. Eng. and Process.* **30**, 97-106 (1991)

J61. "Catalytic and Electrocatalytic Reactions in Solid Electrolyte Cells: The NEMCA effect" C.G. Vayenas, S. Bebelis, I.V. Yentekakis, P. Tsiakaras, H. Karasali and Ch. Karavasilis, *Materials Science Forum* **76**, 141-148 (1991)

J62. "Work Function Measurements in Solid Electrolyte Cells: Dependence of Electrode Work Function on Electrode Potential and Polarization". S. Bebelis and C.G. Vayenas, *Materials Science Forum* **76**, 221-224 (1991)

J63. "NEMCA: The Oxidation of CO on Pt", H. Karasali and C.G. Vayenas, *Materials Science Forum* **76**, 171-174 (1991)

J64. "NEMCA: The Oxidation of CO on Ag", Ch. Karavasilis, S. Bebelis and C.G. Vayenas, *Materials Science Forum* **76**, 175-178 (1991)

J65. "NEMCA: Methane oxidation on Pt", P. Tsiakaras and C.G. Vayenas, *Materials Science Forum* **76**, 179-182 (1991)

1992

J66. "Non-Faradaic Electrochemical Modification of Catalytic Activity: A Status Report" (Review Paper) C.G. Vayenas, S. Bebelis, I.V. Yentekakis and H.-G. Lintz, *Catalysis Today* **11(3)**, 303-442 (1992)

J67. Effect of Composition, Environmental Factors and cement line mortar coating, on Concrete Carbonation", V.G. Papadakis, M.N. Fardis and C.G. Vayenas, *J. Materials and Structures* **25**, 293-304 (1992)

J68. "Hydration and Carbonation of Pozzolanic Cements", V.G. Papadakis, M.N. Fardis and C.G. Vayenas, *ACI Materials J.* **89**(3/4), 119-130 (1992)

J69. "Non-Faradaic Electrochemical Modification of Catalytic Activity: The Work Function of Electrodes in Solid Electrolyte Cells", C.G. Vayenas, S. Bebelis, I.V. Yentekakis and S. Neophytides, *Solid State Ionics* **53-56**, 97-110 (1992)

J70. "Non-Faradaic Electrochemical Modification of Catalytic Activity: 5. Oxygen Chemisorption on Silver", S. Bebelis and C.G. Vayenas, *J. Catal.* **138**, 570-587 (1992)

J71. "Non-Faradaic Electrochemical Modification of Catalytic Activity: 6. The epoxidation of Ethylene on $Ag/ZrO_2(8mol\%)Y_2O_3$" S. Bebelis and C.G. Vayenas, *J. Catal.* **138**, 588-610 (1992)

1993

J72. "Non-Faradaic Electrochemical Modification of Catalytic Activity: 7. The oxidation of CH_4 on Pt" P. Tsiakaras and C.G. Vayenas, *J. Catalysis* **140**, 53-70 (1993)

J73. "Oxidative Coupling of CH_4 on Ag catalyst-electrodes deposited on $ZrO_2(8mol\% Y_2O_3)$", P. Tsiakaras and C.G. Vayenas, *J. Catalysis* **144**, 333-347 (1993)

J74. "Electrochemical Modification of CH_3OH oxidation selectivity and activity on a Pt single-pellet catalytic reactor", C. Cavalca, G. Larsen, C.G. Vayenas and G. Haller, *J. Phys. Chem.* **97**, 6115-6119 (1993)

J75. "In situ High Temperature SERS study of Oxygen adsorbed on Ag: Support and Electrochemical Promotion Effects", D.I. Kondarides, G.N. Papatheodorou, C.G. Vayenas and X.E. Verykios, *Ber. Bunsenges. Phys. Chem.* **97**, 709-720 (1993)

J76. "Solid electrolytes for in situ promotion of catalyst surfaces: The NEMCA effect", C.G. Vayenas, S. Bebelis, I.V. Yentekakis, P. Tsiakaras, H. Karasali and Ch. Karavasilis in "New Frontiers in Catalysis", Guczi et al. (Eds.), *Studies in Surface Science and Catalysis*, Elsevier, Amsterdam, **75**, 2139-2142 (1993)

J77. "Ion spillover as the origin of the NEMCA effect" C.G. Vayenas, S. Bebelis, I.V. Yentekakis, S. Neophytides and Jiang Yi, in T. Inui et al (Editors) New Aspects of Spillover Effect in Catalysis" *Studies in Surface Science and Catalysis* **77**, 111-117, Elsevier Science Publishers (1993)

J78. "High Temperature cyclic voltammetry of Pt electrodes in solid electrolyte cells", Jiang Yi, A. Kaloyannis and C.G. Vayenas, *Electrochimica Acta* **38**(17), 2533-2539 (1993)

J79. "The origin of Non-Faradaic Electrochemical Modification of Catalytic Activity", S. Ladas, S. Kennou, S. Bebelis and C.G. Vayenas, *J. Phys. Chem.* **97**, 8845-8847 (1993)

1994

J80. "Non-Faradaic Electrochemical Modification of Catalytic Activity: Solid Electrolytes as Active Catalyst Supports", C.G. Vayenas, S. Bebelis, I.V. Yentekakis, Ch. Karavasilis and J. Yi, *Solid State Ionics* **72**, 321-327 (1994).

J81. "In situ controlled promotion of catalyst surfaces via NEMCA: The effect of Na on the CO oxidation on Pt", I.V. Yentekakis, G. Moggridge, R.M. Lambert and C.G. Vayenas, *J. Catalysis* **146**, 292-305 (1994).

J82. "Electrochemical promotion in catalysis: Non-Faradaic electrochemical modification of catalytic activity", C.G. Vayenas, S. Ladas, S. Bebelis, I.V. Yentekakis, S. Neophytides, Jiang Yi, Ch. Karavasilis and C. Pliangos, *Electrochimica Acta* **39**(11/12), 1849-1855 (1994).

J83. "Potential-programmed reduction: A new technique for investigating chemisorption on catalysts supported on solid electrolytes", Jiang Yi, I.V. Yentekakis and C.G. Vayenas, *J. Catalysis* **148**, 240-251 (1994)

J84. "In situ controlled promotion of Pt for CO oxidation via NEMCA using CaF_2 as the solid electrolyte", I.V. Yentekakis and C.G. Vayenas, *J. Catalysis* **149**, 238-242 (1994)

J85. "Methane to Ethylene with 85% Yield in a Gas-Recycle Electrocatalytic Reactor-separator", Y. Jiang, I.V. Yentekakis and C.G. Vayenas, *Science* **264**, 1563-1566, (1994)

J86. "Electrochemical Enhancement of a Catalytic Reaction in Aqueous Solution", S. Neophytides, D. Tsiplakides, M. Jaksic, P. Stonehart and C.G. Vayenas, *Nature* **370**, 45-47, (1994)

1995

J87. "Non-Faradaic Electrochemical Modification of Catalytic Activity: 8. Rh-catalyzed C_2H_4 oxidation", C. Pliangos, I.V. Yentekakis, X.E. Verykios and C.G. Vayenas, *J. Catalysis* **154**, 124-136 (1995)

J88. "Electrochemical Promotion of IrO catalyst for the gas phase combustion of ethylene" E. Varkaraki, J. Nicole, E. Plattner, Ch. Comninellis and C.G. Vayenas, *J. Appl. Electrochemistry* **25**, 978-981 (1995)

J89. "Electrochemical Promotion in Emission Control Catalysis", R.M. Lambert, I.R.Harkness, I.V. Yentekakis and C.G. Vayenas, *Ionics* **1**, 29-32 (1995)

J90. "The effect of Catalyst-Electrode Potential and Work Function on the Chemisorptive Bond of Oxygen on Pt interfaced with YSZ", S.G. Neophytides and C.G. Vayenas, *Ionics* **1**, 80-84 (1995).

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P7. PCT Patent Appl. GR94/00001 "Method and Apparatus for Forming Ethylene from Methane" C.G. Vayenas, I.V. Yentekakis and Y. Jiang (1994).

P8. European Patent Appl. 94600002.3 "New monolithic three-way catalysts with optimized distribution of precious metals within three separate washcoat layers" C.G. Vayenas, X.E. Verykios, V.G. Papadakis, I.V. Yentekakis, C. Pliangos (1994).

P9. US Patent 6,194,623 B1 "Hydrogenation of organic compounds with the use of the NEMCA effect" A. Frenzel, C.G. Vayenas, A. Giannikos, P. Petrolekas, C. Pliangos (2001).

P10. PCT/GR03/00032 "Triode fuel cell and battery and method for conducting exothermic chemical reactions" C. G. Vayenas, S. Balomenou (2003).

P11. PCT/GR2004/000006 "Method and Apparatus for carrying out electrochemically promoted reactions" C.G. Vayenas, S. Balomenou, D. Tsiplakides, A. Katsaounis, S. Brosda, G. Foti, C. Comninellis, S. Thieman-Handler, B. Cramer, (2004).

P12. U.S. Patent 7,267,807 B2 "Method and Device for Treating Automotive Exhaust" Leo B. Kriksunov and C.G. Vayenas, (2007).

F. SCIENTIFIC ARTICLES WRITTEN BY OTHERS EXCLUSIVELY ABOUT OUR RESEARCH

1. "Fuel Cell Yields Nitric Oxide", C & EN May 19, (1980), p. 32.
2. "Cogeneration of Nitric Acid and Electricity. Platinum Electrodes Employed in High-Temperature Fuel Cell", Platinum Metals Review 25 (2), April (1981), p.56
3. "Applied Highlights: Fuel cells for cogenerating electricity and SO_2", Chemistry and Industry, 17, September 4, (1989), p. 571
4. "Electrochemical Promotion", by J. Pritchard, Nature 343, pp. 592-593 (1990)
5. "American Concrete Institute Honors 25, one Association", Concrete International 15, 15-22 (1993)
6. "Recycling reactions" P. Szuromi, Science 264, 1513 (1994)
7. "One-step process converts methane to ethylene in 85% yield", C&EN June 13 (1994) p. 41
8. "Chemical engineers near «holy grail»", Chemistry and Industry 22, June 20, 1994
9. "Electrocatalysis: Past, present and Future" in J.O'M. Bockris and Z.S. Minevski, Electrochimica Acta 39, 1471-79 (1994), last section, 1478 "NEMCA 1990's"

G. BOOK REVIEWS

1. "Heterogeneous Catalysis in Industrial Practice, 2nd Edition by C.N. Satterfield Mc-Graw-Hill, NY 1991" C.G. Vayenas J. Catalysis 134, 755-756 (1992).

Served as a referee for the following Journals

Science	AIChE Journal
Journal of Catalysis	I&EC Fundamentals
Journal of Physical Chemistry	The Chemical Engineering Journal
Applied Catalysis A	I&EC Research
Catalysis Rev.-Science and Engineering	Energy and Fuels
Journal of the Electrochemical Society	Computers & Chemical Engineering
Solid State Ionics	Chemical Engineering Communications
Electrochimica Acta	Surface Science
Chemical Engineering Science	Topics in Catalysis
Catalysis Letters	Applied Catalysis B: Environmental
Journal of Applied Electrochemistry	Ionics

I. INVITED SEMINARS IN UNIVERSITIES, INDUSTRY AND RESEARCH CENTERS

1. February 1976, "The Oxidation of SO_2 on Noble Metals" Department of Chemical Engineering, University of California at Davis.
2. February 1976, "The Oxidation of SO_2 on Noble Metals" Department of Chemical Engineering, California Institute of Technology.
3. February 1976, "Electrochemical and Kinetic Study of SO_2 Oxidation on Noble Metals" Department of Chemical Engineering, Stanford University.
4. March 1976, "Electrochemical and Kinetic Study of SO_2 Oxidation on Platinum", Department of Chemical Engineering, Syracuse University.
5. March 1976, "Electrochemical and Kinetic Study of SO_2 Oxidation on Noble Metals", Department of Engineering and Applied Science, Yale University.
6. February 1977, "Electrochemical and Kinetic Study of SO_2 Oxidation on Noble Metals", Department of Chemical Engineering, M.I.T.
7. October 1978, "A New Approach to Oxidation Catalysis: Solid Electrolyte Potentiometry and Electrocatalysis", Department of Chemical Engineering, M.I.T.
8. November 1978, "A New Approach to Oxidation Catalysis: Solid Electrolyte Potentiometry and Electrocatalysis", ILP Symposium on Catalysis, M.I.T.
9. December 1978, "Solid Electrolyte Potentiometry and Electrocatalysis", Monsanto, St. Louis.
10. December 1979, "Cogeneration of Electrical Energy and Nitric Oxide", GM Laboratories, Warren, Michigan.
11. April 1980, "Ammonia High Temperature Fuel Cell", Department of Chemical Engineering, Tufts University.
12. April 1980, "Ammonia High Temperature Fuel Cell", Celanese Research Center, Summit, N.J.
13. July 1980, "Limit Cycle Phenomena During Ethylene and Ammonia Oxidation Over Platinum" Gordon Conference on Chemistry at Interfaces, Meriden, New Hampshire.
14. August 1980, "Vapor Phase Electrocatalytic Ethylene Epoxidation", E.I. DuPont de Nemours, Wilmington, Delaware.
15. October 1980, "Fuel Cell Cogeneration of Electricity and Useful Chemicals", Department of Engineering and Applied Science, Yale University.
16. October 1980, "Fuel Cell Cogeneration of Electricity and Useful Chemicals", Celanese Co., Corpus Christi.
17. October 1980, "Fuel Cell Cogeneration of Electricity and Useful Chemicals", Department of Chemical Engineering, University of Houston.
18. October 1980, "Fuel Cell Cogeneration of Electricity and Useful Chemicals", Exxon Research, Linden, N.J.
19. October 1980, "Limit Cycle Phenomena During Ethylene oxidation on Pt", Department of Chemistry, Brandeis University.
20. April 1981, "Cogeneration of Electricity and Chemicals in High Temperature Electrocatalytic Reactors", W.R. Grace Research Center.
21. September 1981, "Cogeneration of Electricity and Chemicals" Shell Res. Laboratories, Amsterdam, Holland.
22. September 1981, "Solid Electrolytes and Catalysis", Institut Francais du Petrol, Paris, France.
23. September 1981, "Solid Electrolytes and Catalysis", Monte-Edison Research Center, Novarra, Italy.
24. February 1982, "Solid Electrolytes and Catalysis", National Technical University Athens.
25. June 1983, "Solid Electrolyte-Aided Studies of Catalytic Reactions", University of Karlsruhe, F.R. Germany.
26. June 1984, "Optimal Catalyst Activity Distribution in Pellets", W.R. Grace Research, Washington, DC.
27. September 1984, "Solid Electrolytes and Catalysis", University of Thessaloniki, Greece.
28. December 1985, "Solid Electrolytes and Catalysis", Democritos Research Center, Athens, Greece.
29. June 1986, "Catalytic Phenomena in Solid Electrolyte Cells", Imperial College, London, UK.
30. June 1986, "Cogeneration of Electrical Power and Chemicals in Solid Electrolyte Cells" British Gas Research Division, London, UK.

31. September 1987, "Catalytic Phenomena in Solid Electrolyte Cells", University of Twente, Holland.
32. March 1988, "Catalytic and Electrocatalytic Reactions in Solid Oxide Fuel Cells", T.N.O., Zeist, Holland.
33. March 1988 "Solid Electrolytes and Catalysis", University of Liege, Belgium.
34. December 1988, "Non-Faradaic Electrochemical Modification of Catalytic Activity", W.R. Grace, Columbia, Maryland, USA.
35. December 1988, "Non-Faradaic Electrochemical Modification of Catalytic Activity", Princeton University, Princeton, USA.
36. December 1988, "Non-Faradaic Electrochemical Modification of Catalytic Activity", Yale University, 1988 Dodge Lecture, New Haven, USA.
37. December 1988, "Non-Faradaic Electrochemical Modification of Catalytic Activity", ARCO, Philadelphia, USA.
38. December 1988, "Non-Faradaic Eelectrochemical Modification of Catalytic Activity", University of Pennsylvania, Philadelphia, USA.
39. December 1988, "Non-Faradaic Electrochemical Modification of Catalytic Activity", University of Rochester, Rochester, USA.
40. December 1988, "Non-Faradaic Electrochemical Modification of Catalytic Activity", MIT, Cambridge, USA.
41. February 1990, "Solid Electrolytes and Catalysis", École Polytechnique Federale de Lausanne, Switzerland.
42. February 1990, "Non-Faradaic Electrochemical Modification of Catalytic Activity", École Polytechnique Federale de Lausanne, Switzerland.
43. February 1990, "On the origin of the NEMCA effect and on the dependence of catalytic rates on catalyst work function", École Polytechnique Federale de Lausanne, Switzerland.
44. March 1990, "Ethylene Epoxidation on Silver", École Polytechnique Federale de Lausanne, Switzerland.
45. March 1990, "Chemical Cogeneration", École Polytechnique Federale de Lausanne, Switzerland.
46. March 1990, "Non-Faradaic Electrochemical Modification of Catalytic Activity", Université de Poitiers, France.
47. September 1990, "Non-Faradaic Electrochemical Modification of Catalytic Activity" Center for Industrial Research (SI), Oslo, Norway.
48. October 1990, "Non-Faradaic Electrochemical Modification of Catalytic Activity. Oxidation and Oxidative Coupling of Methane", RISØ, Roskilde, Denmark.
49. October 1990, "Non-Faradaic Electrochemical Modification of Catalytic Activity", Chemetal-Lurgi, Frankfurt, Germany.
50. April, 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity", KFA Research Center, Julich, Germany
51. April, 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity", University of Hannover, Germany
52. June 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity", University of Tübingen, Germany
53. September 1991, "Promotion effects in Catalysis: Dependence of Catalytic Rates on Catalyst Work Function", W.R. Grace Research, Washington DC, USA
54. September 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity" Exxon Research, Annandale, NJ, USA
55. October 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity"
City College, City University of New York, USA
56. October 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity"
New England Catalysis Society, Worcester, Mass., USA
57. November 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity" Brookhaven National Laboratory, Long Island, USA
58. November 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity" Tufts University, Boston, USA
59. December 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity"

Yale University, New Haven, USA

60. March 1992, "Non-Faradaic Electrochemical Modification of Catalytic Activity" Princeton University, USA

61. March 1992, "Non-Faradaic Electrochemical Modification of Catalytic Activity" University of Pennsylvania, USA

62. March 1992, "Non-Faradaic Electrochemical Modification of Catalytic Activity" Rohm & Haas, Pennsylvania, USA

63. March 1992, "Non-Faradaic Electrochemical Modification of Catalytic Activity" MIT, Cambridge, Ma, USA

64. March 1993, "Non-Faradaic Electrochemical Modification of Catalytic Activity" Fritz Haber Institute, Berlin, Germany

65. March 1993, "Non-Faradaic Electrochemical Modification of Catalytic Activity" LURGI GmbH, Frankfurt, Germany

66. April 1993, "Non-Faradaic Electrochemical Modification of Catalytic Activity" University of Milano, Italy

67. December 1993, "Non-Faradaic Electrochemical Modification of Catalytic Activity" University of Thessaloniki, Greece

68. May 1994, "Non-Faradaic Electrochemical Modification of Catalytic Activity" National Research Foundation (EIE), Athens, Greece

69. May 1994, "Non-Faradaic Electrochemical Modification of Catalytic Activity" EPRI, Palo Alto, Ca, USA

70. May 1995, "Non-Faradaic Electrochemical Modication of Catalytic Activity", BASF, Ludwigshaven, Germany

71. June 1995, "Electrochemical Activation of Catalysis", Weizmann Institute of Science, Rehovot, Israel

72. June 1995, "Electrochemical Activation of Catalysis", Technion, Haifa, Israel

73. June 1995, "Electrochemical Activation of Catalysis", University of Crete, Greece

74. August 1995, "Electrochemical Activation of Catalysis", Dalian Institute of Chemical Physics, Dalian, China

75. May 1996, "Electrochemical Activation of Catalysis", University of Ulm, Germany

76. October 1996, "Electrochemical Activation of Catalysis", KFA Research Center, Jülich, Germany

77. December 1996, "Electrochemical Activation of Catalysis", Electricité de France (EDF), Paris, France

78. February 1997, "Electrochemical Activation of Catalysis" Société Vandoise des Sciences Naturelles, Lausanne, Switzerland

79. March 1997, "Electrochemical Activation of Catalysis", Democritos Research Center, Athens

80. March 1997, "The NEMCA effect" BASF, Ludwigshafen, Germany

81. December 1997, "The NEMCA effect", Lurgi, Frankfurt, Germany

82. December 1997, "The NEMCA effect", BASF, Ludwigshafen, Germany

83. March 1998, "Electrons and Catalysis", Physics Department, University of Thessaloniki

84. November 1998, "Electrons and Catalysis", University of Thessaly

85. June 1999, "Electrochemical Promotion of Catalysis", EPFL, Lausanne

86. January 2000, "Electrochemical Promotion of Catalysis", BASF, Ludwigshafen, Germany

87. March 2000, "Electropromotion with proton conductors", Schloss Ringberg, Germany

88. March 2000, "Electrochemical Promotion of Catalysis", New England-New York, Catalysis Club, Bethlehem, PA, USA

89. March 2000, "Electrochemical Promotion of Catalysis", Engelhard, Philadelphia, USA

90. March 2000, "Electrochemical Promotion of Catalysis", Atofina, King of Prussia, PA, USA

91. June 2000, "Electrochemical Promotion of Catalysis", Technion, Haifa, Israel

92. June 2000, "Electrochemical Promotion of Catalysis", Weizmann Institute, Rehovot, Israel

93. November 2000, "Electrochemical Promotion of Catalysis", Twente University, Holland

94. March 2001, "Electrochemical Promotion of Catalysis", Bosch, Stuttgart, Germany

95. May 2001, "Electrochemical Promotion of Catalysis", NSF-EPRI, Washington DC, USA

96. September 2001, "Electrochemical Promotion of Catalysis" Ulm University, Ulm, Germany

97. November 2003, "Electrochemical Promotion of Catalysis" DuPont, Wilmington, DE, USA

98. November 2003, "SOFC and PEM fuel cells" Atofina, King of Prussia, USA
99. November 2003, "Electrochemical Promotion of Catalysis" UC Berkeley, Chemistry Dept. USA
100. February 2004, "SOFC and PEM fuel Cells" University of Thessaly
101. February 2005, "Electrochemical Promotion", Université de Nancy, France
102. April 2006, "Proton interactions in chemical, electrochemical and physical systems", EPFL, Lausanne
103. March 2006, "The double layer approach to Promotion, Electrochemical Promotion and Metal-Support Interactions" (Invited lecture), Université de Lyon and CNRS, France
104. March 2006, "The search for the origin of Electrochemical Promotion" (Invited lecture), Université de Lyon and CNRS, France
105. March 2006, "The Interface of Catalysis and Electrochemistry: Electrochemical promotion of Catalysis" (Invited lecture), Université de Lyon and CNRS, France
106. June 2007, "Electrochemical promotion of Catalysis", Université de Lyon and CNRS, France
107. June 2007, "Electrochemical Promotion of Catalysis", St. Gobain Research Center, France
108. May 2008, "Non-Faradaic electrochemical activation of catalysis: Phenomenology, theory and applications", (Invited lecture), EPFL
109. October 2010, "Promotion, Electrochemical Promotion and Metal-Support Interactions", Fritz-Haber Institute der Max-Planck Gesellschaft, (Invited Lecture), Berlin, Germany.
110. April 2015, "Bohr-type mathematical modelling of mass generation via confinement of relativistic particles". (Invited lecture), Princeton University, USA
111. July 2015, "Bridging Catalysis and Electrochemistry", (Invited lecture) 3rd Hellenic forum for Science Technology and Innovation, National Center for Scientific Research "Demokritos", Athens, Greece

K. PLENARY, KEYNOTE AND INVITED LECTURES IN INTERNATIONAL CONFERENCES

1. July 1980, "Limit Cycle Phenomena during Ethylene and Ammonia Oxidation over Pt" Invited Lecture, Gordon Conference on Chemistry at Interfaces, Meriden,New Hampshire

2. September 1987, "Catalytic and Electrocatalytic Phenomena in Solid Electrolyte Cells", Plenary Lecture, 6th International Conference on Solid State Ionics, Garmisch-Partenkirchen, F.R. Germany, Sept. 6-11, 1987.

3. September 1987, "Faradaic and NonFaradaic electrocatalysis in Solid Electrolyte Cells", Invited Keynote Lecture, 38th Meeting of the International Society of Electrochemistry (ISE). Maastricht, Holland Sept. 14-18, 1987.

4. November 1989, "Non-Faradaic Electrochemical Modification of Catalytic Activity in Zirconia Cells" (plenary lecture given by S. Seimanides), American Ceramic Association National Meeting, Annaheim, USA.

5. April 1990, "Non-Faradaic Electrochemical Modification of Catalytic Activity", (invited lecture) Rideal Congress on Catalysis, Cambridge, England.

6. November 1990, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (invited lecture) Shell Conference on Oxidation Catalysis, Wolfheze, Holland

7. April 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (plenary lecture) 3d Intnl. Symposium on Systems with Fast Ionic Transport, Holzhau, Germany

8. June 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (invited lecture), Gordon Conference on Catalysis, New Hampshire, USA

9. September 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (plenary lecture), 7th Intnl. Symposium on Heterogeneous Catalysis, Varna, Bulgaria

10. October 1991, "Non-Faradaic Electrochemical Modification of Catalytic Activity in Solid Electrolyte cells" (keynote lecture), 8th International Conference on Solid State Ionics, Lake Louise, Canada

11. July 1992, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (Invited Lecture) 1992, International Symposium on C_1 Reactions, Vienna, Austria

12. November 1992, "Electrochemical Activation of Catalyzed Reactions" (Invited Lecture) NATO Advanced Research Workshop "Elementary reaction steps in Heterogeneous Catalysis", Bedoin, France.

13. May 1993, "Electrochemical Activation of Catalyzed Reactions" (Invited Lecture), 13th European Chemical Reaction Engineering Conference (CCRE 13), Windsor, England

14. July 1993, "In situ reversible promotion of Catalysts using ion-conducting metal oxides" (Invited lecture) 2nd Schwab Conference, Berlin, Germany

15. August 1993, "Ion spillover as the origin of the NEMCA effect" (Invited lecture) 3d International Conference on spillover, Kyoto, Japan

16. September 1993, "Non-Faradaic Electrochemical Modification of Catalytic Activity in solid electrolyte cells" (Plenary lecture) 14th International Symposium on Materials Science, Riso, Denmark

17. September 1993, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (Keynote Lecture) 9th International Conference on Solid State Ionics, The Hague, Netherlands

18. September 1993, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (Keynote lecture) International Symposium on Electrocatalysis, Ferrara, Italy

19. May 1994, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (Invited Lecture) 185th Electrochemical Society Meeting, San Francisco, USA

20. August 1994, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (Keynote Lecture) 45th Intnl. Society of Electrochemistry (ISE) Meeting, Oporto, Portugal

21. May 1995, "In situ controlled Promotion of catalyst surfaces via Solid Electrolytes" (Keynote Lecture) 94th Annual Meeting of the Deutsche Bunsen-Gesellschaft für Physikalische Chemie, Bremen, Germany

22. June 1995, "Non-faradaic Electrochemical Modification of Catlaytic Activity" (Plenary Lecture) 13th International Symposium on Electrochemistry, Vranka Bania, Jugoslavia

23. September 1995, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (Invited talk) 46th Annual International Society of Electrochemistry (ISE) Conference, Xiamen, China

24. November 1995, "Non-Faradaic Electrochemical Modification of Catalytic Activity" (Invited Lecture given by I.V. Yentekakis) 186th Electrochemical Society Meeting, Chicago, U.S.A.

25. March 1996, "Electrochemical Activation of Catalysis" (Invited Lecture) European Workshop on the relation between Solid State and Aqueous Electrochemistry Schloss Ringeberg, Germany

26. September 1996, "Non-Faradaic Electrochemical Modification of Catalytic Activity using solid electrolytes" 3rd Euroconference on Solid State Ionics, (Invited Lecture), Sardinia, Italy

27. October 1996, "Electrochemical Activation of Catalysis" (Award Lecture) 190th ECS Meeting, San Antonio, USA

28. October 1996, "Electrochemical Activation of Catalysis" (Plenary Lecture) GDCh Angewandte Electrochemie, Monheim, Germany

29. July 1997, "The modern problems of gas phase electrocatalysis and electrochemical promotion" (Plenary Lecture) 2nd memorial G.K. Boreskov Conference, Novosibirsk, Russia

30. July 1997, "Thermodynamic and kinetic considerations of Solid Gas Interactions, Catalysis, Electrocatalysis, Gas reforming" (3 invited lectures) International School of materials Science and Technology, Erice, Italy

31. September 1997, "Direct STM, XPS and TPD observation of spillover phenomena over mm distances on metal catalyst films interfaced with solid electrolytes (plenary lecture) 4th Intnl. Conference on Spillover, Dalian, China

32. September 1997, "Electrochemical activation of complete and partial oxidation reactions" (plenary lecture) 2nd World Congress on Oxidation Catalysis, San Diego, U.S.A.

33. September 1999, "Electrochemical promotion of environmentally important reactions" 50th International Society of Electrochemistry (ISE) Meeting (Keynote lecture), Pavia, Italy

34. September 1999, "Electrochemical Promotion: Origin and Applications" 3rd International Conference on Electrocatalysis (Keynote lecture), Portoroz, Slovenia

35. October 1999, "Electrochemical Promotion in Catalysis" Euroconference on Fast Oxidation Catalysis, (Keynote lecture), Lelystadt, Holland

36. September 2002, "Electrochemical Promotion in Catalysis", 53rd International Conference of ISE, (Keynote Lecture), Düsseldorf, Germany

37. September 2003, "Electrochemical Promotion in Catalysis", 54th International Conference of ISE, (Keynote Lecture), San Pedro, Brazil

38. May 2004, "A new triode fuel cell", 7th ISSFIT, (Invited talk), Slovenia

39. May 2004, "Thermodynamics of Adsorbed Species and the Double Layer approach to catalysis", PPEPPD-2004, (Invited talk), Salt Lake City, USA

40. September, 2004, "Solid State Electrocatalysis and Electrochemical Promotion: From Fundamentals to Monolithic Electropromoted Reactors", 55th ISE, (Keynote Lecture), Thessaloniki, Greece.

41. September 2004, "Electrochemical Promotion of Catalysis", (Plenary Lecture), 55th International Conference of ISE, Thessaloniki, Greece

42. July, 2005, "Solid Electrolyte Electrocatalysis and Electrochemical Promotion", 3rd Gerisher Symposium on Electrocatalysis: Theory and Experiment, (Invited talk), Berlin

43. May 2006, "STM observation of the origin of electrochemical promotion on metal catalyst-electrodes interfaced with YSZ and β″-Al_2O_3", International Symposium on Surface Imaging/Spectroscopy at the Solid/Liquid Interface, (Invited talk), Krakow, Poland

44. August, 2006, "First principles computation of the conductivity of hydrated Nafion membranes", 57th Annual Meeting of the ISE, (Invited talk), Edinburgh, UK

45. September 2006, "Catalysis and electrocatalysis in SOFCs Internal reforming SOFCs – chemical cogeneration", 3rd Summer school on Solid Oxide Fuel Cell Technology, (Invited talk), Limnos, Greece

46. June 2007, "Proton Transport in Electrocatalytic, Catalytic and Physical Environments", Symposium on Advances in Selective Heterogeneous Oxidation Catalysis, (Invited lecture), Kloster Irsee, Germany

47. August 2007, "Electrochemical and Classical Promotion: Common features and Rules", VIII Europacat, (Keynote lecture), Turku, Finland

48. September 2007, "Fuel cells and our energy future", 1st Polish forum on Fuel Cells and Hydrogen, (Plenary lecture), Zakopane, Poland

49. September 2007, "Isotopic Oxygen investigation of the origin of Metal-Support Interactions and Electrochemical Promotion using supported metal catalysts", 58th ISE Meeting, (Keynote lecture), Banff, Canada

50. October, 2007, "The quest for the origin of Electrochemical Promotion", 1st International Conference on the Origin of Electrochemical Promotion of Catalysis (OREPOC), (Plenary Lecture), Thessaloniki. Greece

51. June, 2008, "Electrochemical and chemical promotion of catalysis", 5th University of California Symposium on Surface Science and its Applications, (Invited talk), Santa Barbara, U.S.A.

52. August 2008, "Electrochemically promoted monolithic reactors", 8th European Symposium on Electrochemical Engineering (ESEE), CHISA Congress, (Keynote Lecture), Prague, Czech Republic.

53. September 2008, "Electrochemical promotion of catalytic reactions with sputtered metal catalyst-electrode films in a monolithic electropromoted reactor", 59th Annual Meeting of the International Society of Electrochemistry, (Invited talk), Seville, Spain

54. July 2009, "Electrocatalysis and Electrochemical Promotion with Oxygen Ion and Proton Conductors", SSI-17, (Plenary lecture), Toronto, Canada.

55. October 2009, "Mobile ions as promoters on catalyst surfaces" International Bunsen Discussion Meeting, (Keynote Lecture), Muenster, Germany.

56. June 2010, "Electrochemical Promotion of Selective Oxidations: Some Examples", Irsee V Conference, (Invited Talk), Irsee, Germany.

57. June 2010, "Electrochemical Promotion of Catalysis", RSE-SEE, (Invited Talk), Beograd, Serbia.

58. August 2010, "Electrochemical Promotion of Catalysis", ACS, 240th National Meeting and Exposition Symposium, (Invited Talk) Boston, USA.

59. September 2010, "On the Negative Impedance Region and Proton Transfer Mechanism in Fully Hydrated Nafion Membranes", The 61st Annual Meeting of the International Society of Electrochemistry, (Invited Talk), Nice, France.

60. June 2011, "Chemical Cogeneration and Electrochemical Promotion of Catalysis", Summer School: "Energy and Materials from the Sun" , Rolduc Abbey, The Netherlands.

61. July 2011, "The Use of Anionic and Cationic Conductors for the Electrochemical Promotion of Catalysis", The 18th International Conference on Solid State Ionics, (Plenary lecture), Warszawa, Poland.

62. October 2011, "Perfluorinated membranes & Proton conduction mechanism". (Invited talk) Summer school: Electrolytes for PEM Water electrolysis,

63. August 2012, "Triode operation of CO poisoned PEM fuel cells". (Invited talk) 63rd Annual Meeting of the ISE, Prague, Czech.

64. October 2012, "Rules of classical and electrochemical promotion". (Plenary lecture) 12th Catalysis symposium, Chania, Greece.

65. April 2013, "Modeling of the structure of protons and neutrons". Academy of Athens, Greece

66. April 2013, "Electrochemical promotion with Oxygen Ion and Proton conductors". (Keynote Lecture) RGJ-PhD Congress XIV, Pattaya, Thailand.

67. July 2013, "Rules and modeling of classical and electrochemical promotion". (Invited lecture) Irsee IV Conference, Germany.

68. September 2013, "Mathematical modeling of mass generation via confinement of relativistic particles", IC-MSQUARE, Prague, Czech.

69. September 2013, "Electrochemical promotion of CO_2 hydrogenation on Ru films deposited on O^{2-} and Na^{+} conductors". (Invited lecture) IC^3, Lyon, France.

70. October 2013, "Triode Fuel Cells". (Invited Lecture) Smart Energy convention & storage IV polish forum. Krynica, Poland.

71. July 2014, "A Bohr type model of a composite particle using gravity as the attractive force" (Invited Lecture) 4th Ph.D. School on "Mathematical Modeling of Complex Systems", Athens, Greece.

72. August 2014, "Microscopic black hole stabilization via the uncertainty principle". International Conference on Mathematical Modeling in Physical Sciences, Madrid, Spain.

73. September 2014, "Electrochemical Promotion of Catalysis: Novel Catalyst – Electrodes and reactors", (Keynote Lecture) 65th Annual Meeting of the ISE, Lausanne, Switzerland.

74. October 2014, "Enhanced Oxygen Reduction using Triode Fuel Cells". (Invited lecture) 226th Meeting of the ECS, Cancun, Mexico.

75. October 2014, "Electrochemical Promotion of Catalysis: Novel Catalyst-Electrodes and reactors", (Keynote lecture) 10th European Symposium on Electrochemical Engineering, Sardinia, Italy.

76. April 2015, "Rules of Chemical and Electrochemical Promotion and their application for the conversion of CO_2 to hydrocarbons". Greg Botsaris Memorial Symposium. Boston, USA.

77. August 2017, "Gravitationally confined relativistic neutrinos", 18th Lomonosov Conference on Elementary Particle Physics, (Keynote Lecture), Moskow, Russia.

78. September 2017, "Rules of Promotion in Oxidation Catalysis". 8th World Congress on Oxidation Catalysis, (Keynote Lecture), Krakow, Poland.

GRADUATE STUDENTS SUPERVISION

Ph.D. Students **:**

1. James Michaels, Sc.D. M.I.T. (1983) (with J. Wei), Associate Professor, University of California, Berkeley, Mobil, NJ
2. Michael Stoukides, Sc.D.M.I.T. (1982), Associate Professor Tufts University, Professor, University of Thessaloniki
3. Mark Manton, Sc.D. MIT (1986) (with J. Wei), Shell Laboratories, Amsterdam
4. Ioannis V. Yentekakis, Ph.D. (1987) Postdoctoral Fellow, Princeton University, Professor, Technical University of Crete
5. Stelios G. Neophytides, Ph.D. (1988), Postdoctoral Fellow, Gent University, Univ. of Patras, Research Director, ICE/HT Patras
6. Symeon Bebelis, PhD (1989), Assistant Professor, University of Patras
7. Vagelis G. Papadakis, PhD (1990), Associate Professor, University of Ioannina
8. Efstratios Kolyfetis, PhD (1993), Researcher, AGET Herakles, Athens
9. Demetrios Spartinos, PhD (1993), Lecturer, University of Patras
10. Panagiotis Tsiakaras, PhD (1993), Professor, University of Thessaly
11. Apostolos Ioannides, PhD (1993), Private Instructor, Patras
12. Christos Karavasilis, PhD (1994), Researcher, Lube Processing Co. (LPC), Athens
13. Heleni Karasali, PhD (1994), Researcher-Lecturer, Benaki Phytopathological Institute, Athens
14. Yi Jiang, PhD (1994), Associate Professor, Dalian Institute of Chemical Physics, Dalian, China
15. Costas Pliangos, PhD (1995), Postdoctoral coworker, University of Patras
16. Antony Kaloyannis, PhD (1995), Bacakos Inc., Sales Manager, Athens
17. Maria Makri, PhD (1999), Postdoctoral researcher, University of Patras
18. Constantina Yiokari, PhD (2000)
19. Dimitrios Tsiplakides, PhD (2001), Associate Professor, Aristotle University of Thessaloniki
20. Yannis Bafas, PhD (2003)
21. Costas Raptis, PhD (2003)
22. Thomas Bathas, PhD (2003)
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28. Dimitra Archonta, PhD (2007)
29. C. Koutsodontis, PhD (2008)
30. F. Sapountzi, PhD (2009)
31. S. Souentie, PhD (2009)
32. D. Presvytes, PhD (2009)
33. M. Tsampas, PhD (2010)
34. V. Papaioannou, PhD (2010)
35. D. Theleritis, PhD (2015)
36. I. Kalaitzidou, PhD (2017)
37. M-E. Makri, PhD (2017)
38. D. Grigoriou, PhD (2018)
39. E. Martino, PhD (2019)

40. D. Zagoraios, PhD expected
41. Ch. Chatzilias, PhD expected
42. N. Kokkinou, PhD expected

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3. James Mulready, M.S., M.I.T. (1980)
4. Catherine Teague-Sigal, M.S., M.I.T. (1981)
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6. S. Divane, MSc (2011) U. Patras
7. A. Symillides, MSc (2016) U. Patras

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2. Jiang Yi (1994-96), Associate Professor, Dalian University
3. Xingang Li (2005-2006), Associate Professor, School of Chemical Engineering and Technology, Tianjin University, China