

NIKOLAS A. CHANIOTAKIS

*Associate Professor
Director of Analytical Chemistry Laboratory*



Personal Information

Date of Birth: 08 August 1960
Place of Birth: Anatoli Ierapetra Crete
Citizenship: Greek
Marital Status: Married, 3 children

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EDUCATION

Post Doctorate Research Experience (1989 -1990): Laboratorium für Organische Chemie, Eidgenössische Technische Hochschule (ETH) Zentrum. Zurich, Switzerland under the supervision of Prof. W. Simon.

Doctor of Philosophy: (May, 1989) Department of Chemistry, The University of Michigan, Ann Arbor, MI, under the supervision of Prof. M. Meyerhoff.

Master of Science: (Spring, 1987) Department of Chemistry, The University of Michigan, Ann Arbor, MI. USA.

Bachelor of Science: (Spring, 1984) Department of Chemistry, Institute of Technology, The University of Minnesota, Minneapolis, MN. USA. Diploma work with Prof. Reynolds (inorganic electrochemistry) and Prof. Leete (natural product synthesis).

RESEARCH AND TEACHING EXPERIENCE

Associate professor: (1997-present). Have completed 3 Ph. D. Theses, 3 MS Theses. Currently supervising 6 graduate students, 1 undergraduate, and 1 visitor. Teaching Instrumental Analytical Chemistry one semester per year to third year undergraduate students. Responsible for the Laboratory of Instrumental Analytical Chemistry I. Teaching one graduate course per in the area of Analytical Chemistry, Electrochemistry and biosensors. Teaching part-time in two graduate programs of the Department of Chemistry, that of “Environmental Science and Engineering” and “Isolation and Synthesis of Natural Products”. Teaching general chemistry for the department of material sciences.

Assistant Professor: (1991-1997) Research coordinator to graduate and undergraduate students. Teaching graduate courses centered on biosensors (2 semesters), Analytical Chemistry I (4 semesters) and II (3 semesters), and General Chemistry II (one semester). Responsible for the Analytical Chemistry laboratory I (5 semesters) and II (5 semesters) including, setting up the experiments and coordination.

Specialized Scientist. (1990-1991). The Greek Army. Worked with developing a database to be used as information bank for information exchange between the training base and the central army offices.

Post Doctorate Fellow, (1989 - 1990) Laboratorium fur Organische Chemie, ETH, Zurich, Switzerland (with Prof. Dr. W. Simon). Development of optical reversible oxygen sensor (oxygen optode). Design of novel ionophores and chromophores. Design and use of optical sensors (optodes) for the determination of different ions. Design of novel pH carriers for potentiometric monitoring of pH in biological fluids (stomach pH catheters).

Research Assistant. (1986 - 1989) Department of Chemistry, The University of Michigan, Ann Arbor, MI. Thesis project was the development and application of metalloporphyrins as novel selective carriers for anion sensing. Thesis title: *Metalloporphyrins as Anion Carriers in Membrane Electrodes*. Research advisor, Prof. Dr. M. E. Meyerhoff.

Research Interests

A. Development and application of biosensors in environmental, clinical and research environments.

In the area of Biosensors we are interested in the development of novel matrices and methodologies for the enzyme stabilization. Our studies have concentrated in the use of a novel carbon matrix that have also been used with great success in the development of chemical sensors. This matrix has a high hydrophilicity, controlled pore size and high conductivity.

Recent results indicate that the porous carbon can actually be used as an alternative to carbon paste matrix. The immobilization of the enzyme can be achieved either by direct adsorption to the surface of the electrode, or by covalent bonding, while both organic and inorganic solvents can be utilized. Additionally, the stabilization of the enzymes with different amounts and types of polyelectrolytes is examined.

B. The development of chemical sensors and microsensors for ions, gases and other redox species as stand alone devices, or sensing elements in analytical instrumentation.

In order to develop novel selective and sensitive sensors for the in-situ or in-vivo measurements, it is mandatory to have the appropriate chemical compound that will perform the recognition of the analyte without interference from other similar species present in the solution.

The major section of our activity in this area is devoted to the design and synthesis of novel organic and organometallic compounds, the so-called carriers, since they are the basis for the development of novel sensors. The main transduction mechanisms used for measuring the signal are the electrochemical and the optical ones. Sensors for the measurement of salicylate, thiocyanate, nitrite, fluoride, phosphate, and ammonia, have been developed and applied with success.

C. The development of analytical methodologies for direct and indirect chemical analysis

A variety of applied research projects relating the development of new analytical instrumentation as well as method optimization and application in a range of analytical disciplines are under way. Various sensors are employed to perform sample analysis using Flow Injection Analysis (F.I.A.) manifolds. The developments of FA systems for the monitoring of ammonia in sea and wastewater, and for the determination of magnesium in drinking water have been accomplished. Moreover research projects for the development of Post Column Derivatization HPLC methodologies and their application in a variety of samples are under way.

Graduate Students Completed their Degrees at the Laboratory

1. I. Tsagkatakis Ph.D. 1999 (currently Post Doc with E. Backer USA)
2. L. Moschou Ph.D. 2000 (currently Post Doc Silvia Daurnet Lexington USA)
3. V. Gavalas Ph.D. 2000 (currently Post Doc. L. Bachas Lexington USA)

4. I. Tsagkatakis Ms 1996
5. G. Andreadakis MS 1997
6. M. Geniatakis Ms 2000

Diploma Thesis Performed in the Laboratory

- 1 Maria Vamvakaki: “Molecular transport via Organic Membranes”
- 2 George Melidoneas “Anion selective organometallic carriers”
- 3 Vasilis Gavalas “Amperometric biosensors for glucose”
- 4 Lisa Moschou “Measurement of Mg^{2+} and NO_3^- using ISEs”
- 5 George Andreadakis “Optical measurement of anions based on Metal –Dithiazone complexes.
- 6 Anastasios Solthatos “Development of methodologies for the monitoring of detergents”
- 7 Basiliki Vamvakaki: Studies on the optimization of biosensors based on the enzyme of Tirocynase and Glucose oxidase”
- 8 Katerina Matheou: “Water treatment in power generating plants, and treatment of its waste waters”
- 9 Vagelis Dimakis “Study of the effect of polyelectrolyte PEI on the operational characteristics of biosensors”
- 10 Eleni Gouliaditi: “Study of organotin compounds in ISEs”

Current Laboratory Students

1. K. Perdikaki Ph. D Candidate
2. M. Fuskaki Ms Candidate
3. V. Davari Ms Candidate
4. V. Vamvakaki Ph.D Candidate
5. K. Karametsi Ms Candidate
6. V. Ekonomakis Ms Candidate
7. I. Monemvasios Diploma work
8. M. Koci Diploma work

Publications

1. Recent Advances in the Design of Anion and Gas Selective Potentiometric Membrane Electrodes. M. E. Meyerhoff; D. M. Prinitis; N. A. Chaniotakis. *Instrument Society of American Transactions*, 1987, paper # 87-1084, pp. 467-477.
2. Influence of Porphyrin Structure on Anion Selectivities of Mn(III) Porphyrin-Based Membrane Electrodes. N. A. Chaniotakis; A. M. Chasser; M. E. Meyerhoff; J. T. Groves. *Analytical Chemistry*, Vol. 60, (1988) pp. 185-188.
3. Response properties of Ion-Selective Polymeric Electrodes Prepared with Aminated and Carboxylated Poly(Vinyl Chloride). S-C. Ma; N. A. Chaniotakis; M. E. Meyerhoff. *Analytical Chemistry*, Vol. 60, (1989), pp. 2293-2299.
4. Salicylate-Selective Membrane Electrode Based on Tin(IV)-Tetraphenylporphyrin. N. A. Chaniotakis; S. B. Park; M. E. Meyerhoff. *Analytical Chemistry*, Vol. 61, (1989), pp. 566-570.
5. Mn(III)-Porphyrin-Based Thiocyanate-Selective Membrane Electrode: Characterization and Application in Flow Injection Determination of Thiocyanate in Saliva. D. V. Brown; N. A. Chaniotakis; I. H. Lee, S. C. Ma; S. B. Park; M. E. Meyerhoff. *Electroanalysis*, Vol. 1, pp. 477-484.
6. New Anion- and Gas-Selective Potentiometric Sensors. *Chemical Sensors and Microinstrumentation* Editors: Murray et al. M. E. Meyerhoff; D. M. Prinitis, H. S. Yim, N. A. Chaniotakis, S. B. Park. *ACS Symposium Series* No. 403 Chapter 2, pp. 26-45. 1989.
7. Anion Selective Optical Sensors Based on a Coextraction of Anion-Proton Pairs into a Solvent-Polymeric Membrane. S. S. S. Tan, P. C. Hauser, N. A. Chaniotakis, G. Suter and W. Simon. *Chimia*, Vol. 43, (1989), pp. 257-261.
8. Life Time of Neutral Carrier-Based Liquid-Membranes in Aqueous Samples and Blood O. Dinten, U. Spichiger, N. A. Chaniotakis, P. Gehrig, B. Rusterholz, W. E. Morf, W. Simon, *Analytical Chemistry*, Vol. 63, (1991), pp. 596-603.
9. Potentiometric Phosphate Selective Electrode Based on Organometallic Multi-Tin(IV) Carrier. N. A. Chaniotakis, K. Jurkschat and A. Ruthemann. *Analytica Chimica Acta*, 282, 245, 1993.
10. Ion and Gas Selective Electrodes -Research and Applications. N. A. Chaniotakis. *Sensors* 1993. 28 May, 1993.
11. Multiorganotin Compounds. Designing a Novel Phosphate-Selective Carrier. J. K. Tsagatakis, N. A. Chaniotakis, K. Jurkschat. *Helvetica Chimica Acta* **77**, 2191-2196, (1994)
12. From Molecular Recognition to Analytical Information by Chemical Sensors. U. Spichiger, X. Aiping, D. Citterio, H. Buhler, N. Chaniotakis, W. Simon. *Electroanalysis* (1995), **7 No 9**, 859-863.

13. Solid-Contact Ion-Selective Electrodes with Stable Internal Electrode. M. Vamvakaki and N. A. Chaniotakis. *Analytica Chimica Acta*.320 (1996) 53-61)
14. Anion Partitioning Into Highly Lipophilic Organic Phases. G. Andreadakis, J. Tsagatakis, N. A. Chaniotakis. *Electroanalysis*, 9, 1997, pp. 869-872..
15. Chemical Sensors for Anions Based on Sn(IV) Lewis Acidic Carriers. J. K. Tsagatakis, N. A. Chaniotakis, J. Jurckschat. *Quimica Analytica*, (1997) 16 [Suppl. 1]:S105-S109.
16. Organometallic Complexing Agents as Carriers in Polymer-Based Electrodes. N. A. Chaniotakis, J. K. Tsagatakis, R. Willem, and K. Jurckschat. *Reactive & Functional Polymers* 34, (1997) 183-188.
17. Magnesium Ion-Selective Electrode. Optimization and FIA Applications. N. A. Chaniotakis, J. K. Tsagatakis, E. Moshou. *Analytica Chimica Acta*, 356 (1997) 105-111
18. Automated Portable Ammonia Monitor for Sea Water. E. A. Moschou, N. A. Chaniotakis. *American Laboratory*, 10, #7, (1998), p.10
19. Highly Selective Two-Ion-Carrier Chemically Modified FET's. N. A. Chaniotakis, E. Moschou, G. Kostantinidis. *MicroElectronic Engineering*, 41/42 (1998) 481-484.
20. Improved operational stability of biosensors based on enzyme-polyelectrolyte complex adsorbed into a porous carbon electrode. Gavalas, V.G.; Chaniotakis, N.A.; Gibson, T.D. *Biosens. & Bioelectr.* **1998**, 13, 1157-1163.
21. Organometallic complexing agents as carriers in polymer-based electrodes (vol 34, pg 183, 1997) Chaniotakis NA, Tsagatakis JK, Jurkschat K, Willem R *Reactive & Functional Polymers* 38 (2-3): 289-289 1998.
22. Tributyl- and Triphenyltin Benzoates, Phenylacetates, and Cinnamates as Anion Carriers: an Electrochemical Assessment Coupled to Structural NMR Studies and AM1 Calculations. Tsagatakis, J. K.; Chaniotakis, N. A.; Jurkschat, K.; Damoun, S.; Geerlings, P.; Bouhdid, A.; Gielen, M.; Verbruggen, I.; Biesemans, M.; Martins, J. C.; Willem, R. *Helvetica Chimica Acta* 82 (1999) pp 531-542.
23. Polyelectrolyte Stabilized Biosensors. Vasilis G. Gavalas, Nikolas A. Chaniotakis. *Instrumental Methods of Analysis. Modern Trends and Applications. IMA' 99 International Conference Proceedings. Volume I* p.280-284 1999
24. Organotin Anion Carriers and their Applications in Ion-Selective Electrodes. K Perdikaki, J. K Tsagatakis, N. A. Chaniotakis. *Modern Trends and Applications. IMA' 99 International Conference Proceedings Volume I.* p.91-95, 1999

25. Microsensors Based on CHEMFETs Covered with Ion-Partitioning Membranes. E. A. Moschou, N. A. Chaniotakis. Modern Trends and Applications. IMA' 99 International Conference Proceedings. Volume I p.285-289, 1999
26. Post Column Derivatization System for High Performance Liquid Chromatography, Characteristics and Applications in Carbohydrates. Maria G. Fouskaki, Nikolas A. Chaniotakis Pantelis G. Rigas. Modern Trends and Applications. IMA' 99 International Conference Proceedings. Volume II p.604-608, 1999
27. Polyelectrolyte Stabilized Oxidase based Biosensors: Effect of Diethylaminoethyl-dextran on the Stabilization of Glucose and Lactate Oxidases into Porous Conductive Carbon. V. G. Gavalas, N. A. Chaniotakis, *Analytical Chimica Acta*, 404/1 (1999) pp 67-73.
28. Ion-Partitioning Membrane-Based Electrochemical Sensors. E. A. Moshou, N. A. Chaniotakis, *Analytical Chemistry*, 72 n 8 (2000) 1835.
29. Direct Electrochemical Flow Analysis System for Simultaneous Monitoring of Total Ammonia and Nitrite in Seawater E.A. Moschou , U. Azpiroz Lasarte , M. Fouskaki , N.A. Chaniotakis Papandroulakis, P. Divanach. *Aquaculture engineering*, 22 (2000) 255-268.
30. Novel pre-oxidizing cell for elimination of electroactive interferents during biosensor analysis. Application to glucose determination in real samples. Vasilis G. Gavalas, Maria G. Fouskaki, Nikolas A. Chaniotakis. *Analytical Letters* 33, 12 2391-2405 (2000)
31. [60]Fullerene-Mediated Amperometric Biosensors. Vasilis G. Gavalas, Nikolas A. Chaniotakis. *Analytica Chimica Acta*, 404 (2000) 67-73.
32. A new Chloride-Selective Carrier and its Evaluation in Ion-Selectrive Electrodes. K Perdikaki, J. K Tsagatakis, N. A. Chaniotakis, *Microchimica Acta*, 136, 217-221, 2001.
33. CHEMFETs Based Microsensors Covered with Ion-Partitioning Polymeric Membranes. E. A. Moschou, N. A. Chaniotakis. *Microchimica Acta* 136, 205-209 2001
34. Lactate biosensor based on the adsorption of polyelectrolyte stabilized lactate oxidase into porous conductive carbon Gavalas VG, Chaniotakis NA *Microchimica Acta* 136 (3-4): 211-215 2001
35. Phosphate Biosensor Based on Polyelectrolyte-stabilized pyruvate oxidase. V. Gavalas, N. Chaniotakis *Anal. Chim. Acta* 427 (2001) 271-277.
36. Theoretical and Experimental Studies of Metallated Phenanthroline Derivatives. Optimization of the Nitrate Sensor. George E. Andredakis, Elizabeth A. Moschou, Katherine Matthaïou,

- George E. Froudakis, Nikolas A. Chaniotakis. *Analytica Chimica Acta*, 439, (2001) 273-280.
37. Phosphate Binding Characteristics and Selectivity of Bifunctional Organotin Carriers. I. Tsagkatakis, K. Jurkschat, R. Willem, N. A. Chaniotakis. *Helvetica Chimica Acta* Vol. 84 1952-61, 2001
 38. Potassium Selective CHEMFET Based on an Ion-Partitioning Membrane. E. A. Moshou, N. A. Chaniotakis. *Analytica Chimica Acta* 445, 183-190 2001.
 39. Picolinamide Residues as Neutral Hydrogen-Selective Carriers for the Potentiometric Measurement of Subzero pH Values Maria Fouskaki, Thanasis Gimisis and Nikolas A. Chaniotakis, *Electroanalysis*, in press
 40. Synthesis and Characterization of Polymeric Derivatives Containing Grafted Triorganotin Cinnamates with Electrochemical Chloride Response. Luigi Angiolini, Elisabetta Salatelli Daniele Caretti, Monique Biesemans, Hassan Dalil and Rudolph Willem, Nikolas A. Chaniotakis, Eleni Gouliaditi and Katerina Perdikaki, *Macromolecular Chemistry and Physics*. 2002, 203, 219-229
 41. Soluble Polystyrenes Functionalized By Triorganotin Carboxylates. Synthesis, Structure and Electrochemical Anion Response. Hasan Dalil, Monique Biesemans, Rudolph Willem, Luigi Angioni, Elisabetta Saletelli, Daniele Caretti, Nikolas A. Chaniotakis, Katerina Perdikaki. *Helvetica Chimica Acta*, submitted.
 42. Direct Potentiometric Measurement of Nitrate in Plants and soils. M. Geniatakis, M. Fouskaki, N. A. Chaniotakis. In preparation Communications in *Soil Science and Plant Analysis*, Submitted
 43. Super-Nernstian Response to Calcium of the Ion-Partitioning Membrane-Based CHEMFET Elizabeth A. Moschou, and Nikolas A. Chaniotakis, *Analytical Chemistry*, Submitted
 44. Polyelectrolyte-stabilized glucose biosensor based on macroporous adsorbed into porous carbon electrode Vaggelis T. Dimakis, Vasilis G. Gavalas, Nikolas A. Chaniotakis. *Analytica Chimica Acta*, Submitted
 45. Bis (halodiphenyl-stanyl)methane as a highly selective fluoride carrier. Optimization and application in Liquid polymeric Ion-Selective Electrodes. K. Perdikaki, J. Tsagkatakis, N. A. Chaniotakis. *Analytica Chimica Acta*, Submitted.
 46. Evaluation of a Highly Selective Class of Ammonium Ionophores Based on Pyrazol Rings Elizabeth A. Moschou, Xiaowen Wen, Steve West, Sjong Lee, Jik Chin, Maria Fouskaki, Nikolas A. Chaniotakis, *Analytical Chemistry*, Submitted.

47. Novel Carbon Materials in Biosensor Systems , S. Sotiropoulou, V. Gavalas¹, V. Vamvakaki, N. A. Chaniotakis. Biosensors and Bioelectronics, Submitted
48. Ion-Partitioning Membranes as Electroactive Elements for the Development of a Novel Cation-Selective CHEMFET Sensor System. In "New Insights into Membrane Science and Technology: Polymeric, Inorganic, and Bifunctional Membranes". E. Moschou, N. A. Chaniotakis accepted.

Other Publications

49. Quantitative Instrumental Analysis. Textbook for Analytical Chemistry Laboratory I and II. U of Crete 1991.
50. Principles of Instrumental Analysis. Translation into Greek with colleagues from the University of Ioannina, and University of Athens

Presentation –Invited Lectures

1. N. A. Chaniotakis, M. E. Meyerhoff, Metalloporphyrins as Ion-Selective Carriers. Presented during the 18th Central Regional Meeting of the American Chemical Society, June 1-5, 1986.
2. N. A. Chaniotakis, The Determination of Oxygen and Carbon Dioxide in Sediments. Analytical Chemistry Seminar, The University of Michigan, Ann Arbor MI, 1986.
3. N. A. Chaniotakis; M. E. Meyerhoff, Potentiometric Anion Response of Polymeric Membranes doped with Metalloporphyrins. Presented during the 14th. meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, (FACS), October 4, 1987.
4. N. A. Chaniotakis; S. B. Park; M. E. Meyerhoff, Potentiometric Determination of Salicylate Using Sn(TPP)Cl₂ Doped Solvent Polymeric Membranes. Presented during the 15th. meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, (FACSS), November 3, 1988.
5. S-C Ma; N. A. Chaniotakis; M. E. Meyerhoff. Response Properties of Ion-Selective Polymeric Electrodes Prepared with Amminated and Carboxylated Poly(Vinyl Chloride). Presented during the 15th meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, (FACSS), November, 1988.
6. I. H. Lee, S. C. Ma; S. B. Park; M. E. Meyerhoff D. V. Brown; N. A. Chaniotakis Mn(III)-Porphyrin-Based Thiocyanate-Selective Membrane Electrode: Characterization and Application in Flow Injection Determination of Thiocyanate in Saliva. Presented during the 16th. meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, (FACSS), October 1-6, 1989.
7. N. A. Chaniotakis Metalloporphyrins as Anion Carriers in Membrane Electrodes. Analytical Chemistry Seminar. The University of Michigan, Ann Arbor MI., 1988.
8. J. Kollman, M. Lã'Her, W. Simon, N. A. Chaniotakis, Mixed Valence Dicofacial Porphyrins as Dioxygen Optical Transducers.. Analytical Seminar, ETH Zurich, 1989.
9. N. A. Chaniotakis, Ion and Gas Selective Electrodes -Research and Applications. Sensors 1993. 28 May, 1993.
10. N. A. Chaniotakis, J. Tsagatakis, K. Jurckschat, Multidentate Compounds as Anion Carriers in Membrane Electrodes. Presented during the 10th FEICHEM Conference on Organometallic Chemistry, 5-10 Sept. 1993.
11. N. A. Chaniotakis, J. K. Tsagatakis, and M. Vamvakaki., Novel Tin(IV)-Based Potentiometric Phosphate Carriers Presented during the 1994 Pittsburgh Conference, February 28, Chicago, USA.

12. N. A. Chaniotakis, J. Tsagatakis, G. Andredakis, S. West, Partitioning of Anions in Lipophilic Organic Phases Measured by Direct Conductometric Methods.. Presented during the 1995 Pittsburgh Conference, March 4-11, New Orleans, USA.
13. N. A. Chaniotakis, J. Tsagatakis, S. West, Magnesium Measurements in Food Stuffs. Presented during the 1995 Pittsburgh Conference, March 4-11, New Orleans, USA.
14. J. Tsagatakis, N. A. Chaniotakis, K. Jurckschat . Organometallic Compounds as Ion Carriers in Chemical Sensors. 16th National Chemistry Conference, 1995.
15. G. Andredakis, N. A. Chaniotakis. Ion Partitioning in Organic Solvents of Polymeric Membranes. 16th National Chemistry Conference, 1995.
16. J. K. Tsagatakis, N. A. Chaniotakis, K. Jurckshat. Chemical Sensors for Anions Based on Sn(IV) Lewis Acidic Carriers. First Mediterranean Basin Conference of Analytical Chemistry, Cordoba Spain 5-10 November 1995
17. N. A. Chaniotakis Organometallic Complexing Agents as Carriers in Anion Selective Sensors. Invited Lecture. SIMEC 96 May-June 1996, Cordoba, Spain
18. J. K. Tsagatakis, N. A. Chaniotakis, J. Jurckshat. A New Highly Selective Electrode For Use in Direct Measurements of Phosphate in Aqueous Samples. Euroanalysis, September 1996 Italy.
19. E. Moschou, N. A. Chaniotakis, N. Papandrulakis, P. Divanack. Continuous Monitoring of Ammonia in Sea Water. 17th National Chemistry Conference, 1996
20. G. Andredakis, N. A. Chaniotakis. Design and Optimization of Nitrate Selective Carriers. 17th National Chemistry Conference, 1996.
21. V. Gavalas, N. A. Chaniotakis, The effects of the Organic Solvent on the Biosensor Stability. 17th National Chemistry Conference, 1996
22. N. Chaniotakis, R. Hummeltenberg, K. Jurckschat, S. Kuhn, M. Schurmann, J. A. Tsagatakis, R. Willem. New Multidentate Silicon and Tin Containing Lewis Acids for Anion Complexation.
23. N. A. Chaniotakis, E. A. Moschou, N. Papandrulakis, Automated Portable Ammonia Monitor for Sea and Waste Water.. PITCON 97 16-21 March 1997.
24. N. A. Chaniotakis, E. Moschou, G. Constandinidis Highly Selective Two-Ion-Carrier Chemically Modified FET's. Micro and Nano Engineering 97. Athens September 15-18 1997.

25. K. Kopaka, N. A. Chaniotakis, Minoal Salt from Zacros. The Greek Salt. Mitilini 5-8 November, 1998.
26. N. A. Chaniotakis, V. G. Gavalas. Highly Stable Biosensors Based on Absorption of Enzyme-Polyelectrolyte Complexes to Carbon Electrodes. Pitcon 7-12 March, 1999.
27. N. A. Chaniotakis, M. Fouskaki, Post Column Derivatization Reactor for High Performance Liquid Chromatography. Characteristics and Applications in Carbohydrates. Pitcon 7-12 March, 1999.
28. Polyelectrolyte Stabilized Biosensors. Vasilis G. Gavalas, Nikolas A. Chaniotakis. International Conference on Modern Trends and Applications. IMA' 99
29. Organotin Anion Carriers and their Applications in Ion-Selective Electrodes. K Perdikaki, J. K Tsagatakis, N. A. Chaniotakis. International Conference on Modern Trends and Applications. IMA' 99
30. Microsensors Based on CHEMFETs Covered with Ion-Partitioning Membranes. E. A. Moschou, N. A. Chaniotakis. International Conference on Modern Trends and Applications. IMA' 99
31. Post Column Derivatization System for High Performance Liquid Chromatography, Characteristics and Applications in Carbohydrates. Maria G. Fouskaki, Nikolas A. Chaniotakis Pantelis G. Rigas. International Conference on Modern Trends and Applications. IMA' 99
32. Anion Chemical Recognition. Design and Optimization of Sn(IV)-based Selective Carriers Nikolas Chaniotakis, Katerina Perdikaki, yiannis Tsagatakis, PITCON 2000
33. Pyruvate Oxidase-Based Phosphate Biosensor. Optimization and Real Sample Application Studies N. Chaniotakis, V. Gavalas. Pitcon 2000.
34. Selective phosphate recognition based on multifunctional stannyl carriers. Optimization and ISE applications Nikolas Chaniotakis, Katerina Perdikaki,ioannis TsagKatakis, Yu Qin, Eric bakker, Rudolf Willem Pitcon 2001 USA.
35. Selective fluoride recognition based on Bis(halodiphenylstanyl)methanes. Optimization and ISE applications Katerina Perdikaki, Nikolas Chaniotakis. Tsagatakis, _Klaus Jurkschat, Reiner Altmann Pitcon 2001 USA.
36. A neutral Ionophore with High Selectivity for Ammonium. S. J. West, E. A. Moschou, X. Wen, J. Chin, S. J. Lee, N. A. Chaniotakis, M. Fouskaki. Pitcon 2001 USA.

37. "Design and Applications of CHEMFETS Based on Bulk Membrane Cation-Proton Exchange" N. A. Chaniotakis Invited Lecture Second Aegean Analytical Chemistry Days (AACD), International Training Workshop 1-4th November 2000.
38. Carbon nanotubes as novel electroactive materials in biosensors *S. G. Sotiropoulou*, N. A. Chaniotakis. IMA 2001
39. Polyelectrolyte stabilized enzymes for the design of porous carbon-based biosensors *V T Dimakis*, V.G. Gavalas, N.A. Chaniotakis. IMA 2001.
40. Development of a potentiometric Phosphate Selective Sensor for Real sample Analysis. Konstantina V. Karametsi, Ioannis Tsagkatakis, Nikolaos A. Chaniotakis IMA 2001.
41. Lowering the Detection Limits of Ion-Selective Electrodes. Theoretical Aspects and Initial Experimental Evidence for Anion Detection. Maria G. Fouskaki and Nikolas A. Chaniotakis, IMA 2001.
42. Bis(Halodiphenylstanyl) Alkanes as Fluoride Selective Ionophores. Optimization and ISE Applications. Katerina Perdikaki, Ioannis Tsagkatakis, Nikolas A Chaniotakis, IMA 2001.
43. [Ion-partitioning membrane-based CHEMFET with super-Nernstian response to multivalent cations.](#) Elizabeth Moschou, Nikolas Chaniotakis, North American Membrane Society, May 15-20, 2001, Lexington, Kentucky

Seminars-Conferences

1. BIOANALYTICAL METHODS AND SENSORS. May 9-10-11, 1994. Organizing committee, chairman.
2. SIMEC '94. Thermodynamics of Metal Complexes and Molecular Recognition. June 7-10, 1994. Organizing Committee Member.
3. First Mediterranean Conference of Analytical Chemistry, November, 1995, Scientific Committee.
4. International Conference Instrumental Analysis. Modern trends and Applications. Ioannina 5-8 Sept. 2001. Organizing Committee.

Patents

Solid Contact Ion-Selective Electrode. Nikolas A. Chaniotakis, Steven West. US patent # 5,840,168 Nov. 24, 1998.