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## **Academic Studies & Degrees**

- 1995–1999: Department of Chemistry, University of Patras, Patras, Greece  
Ph.D. in Physical Chemistry entitled: “Gas Chromatographic study of the interaction of gaseous substances with liquid and solid surfaces”.

1990–1994: Department of Chemistry, University of Patras, Patras, Greece  
Degree in Chemistry (7.67/10).

## Academic history

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|---|--|
| <i>Postdoctoral researcher:</i>                       | Leiden Institute of Chemistry, University of Leiden, The Netherlands (11/2002-5/2003)  |
| <i>Postdoctoral researcher:</i>                       | Department of Chemistry, University of Patras (2005-2007)  |
| <i>Associate Teaching Staff:</i>                      | Module: Organization and Interaction at Molecular Level (KFE 52), Postgraduate course: Master in Teaching Natural Sciences, Hellenic Open University (2007 - ) |
| <i>Lecturer<br/>in Physical Chemistry:</i>            | Department of Chemistry, Aristotle University of Thessaloniki (January 13, 2014 – November 25, 2015)   |
| <i>Assistant Professor<br/>in Physical Chemistry:</i> | Department of Chemistry, Aristotle University of Thessaloniki (November 25, 2018 – )   |

## **Areas of Specialization and Research Interest**

- Physicochemical measurements by chromatographic methods (Reversed-flow gas chromatography, field-flow fractionation)
- Sorption of gases by heterogeneous solids (gas-solid interface)
- Mass transfer across gas-liquid interface
- Heterogeneous catalysis, Nano materials

## **Reviewer in Scientific Journals**

Journal of Physical Chemistry, Journal of Chromatography A  
Analytical Chemistry, AIChE Journal, Journal Nano Research  
Chemical Engineering Science, Applied Surface Science  
International Journal of Pharmaceutics, Process Biochemistry  
European Polymer Journal, Journal of Hazardous Materials  
ISRN Chromatography, The Open Thermodynamics Journal  
Bioinorganic Chemistry and Applications, Analytical Chemistry: An Indian Journal  
Publishers: ***Elsevier, ACS, Springer, AIChE, Hindawi, TSI, Bentham***

## **Critical Reader**

Volume "Chemical Kinetics", module "Physical Chemistry" (FYE 22), Hellenic Open University (2007).

## **Scholarships**

Postdoctoral research funded by World Gold Council, Leiden Institute of Chemistry, The Netherlands (2002-2003)

## **Member of societies**

1994– Member of the Society of Greek Chemists  
2005– Member of the Greek Union of Adult Education.

## **Publications**

### **Chapters/articles in books/series**

1. Catalyst characterization by reversed flow gas chromatography, **D. Gavril**, *Encyclopedia of Chromatography*, Taylor & Francis (2005–**Invited article**).
2. Application of Reversed Flow Gas Chromatography to Fuel Cells, **D. Gavril**, *Encyclopedia of Chromatography*, Taylor & Francis (2006– **Invited article**).
3. IR Spectra Virtual Simulation, M. Limniou, N. Papadopoulos, **D. Gavril**, A. Touni, M. Chatziapostolidou, *Problem solving in Chemistry*, Royal Society of Chemistry, **submitted** (2020).

## **Teaching material**

### **Printed material**

1. «Chromatography – Liquid Chromatography», module “Physical Chemistry – Laboratorial Practice” (FYE 22), Hellenic Open University (2007).
2. Part A, volume C, entitled «Thermodynamics», module “Organization and Interaction at Molecular Level” (KFE 52), Hellenic Open University (2014).
3. Part C, volume A, entitled «Carbon Compounds», module “Organization and Interaction at Molecular Level” (KFE 52), Hellenic Open University (2014).

### **Alternative teaching material (webcast)**

1. Module “Physical Chemistry – Laboratorial Practice” (FYE 22), Hellenic Open University (2007).
  - Gas Chromatography (duration 2,5 h)
  - Liquid Chromatography (duration 2,5 h)
2. Module “Organization and Interaction at Molecular Level” (KFE 52), Hellenic Open University (2007).
  - Chemical kinetics and Thermodynamics (duration 5,5 h)

## **Scientific Journals**

1. New Gas Chromatographic Instrumentation for Studying Mass Transfer Phenomena. **D. Gavril**, G. Karaiskakis, *Instrum. Sci. & Technol.*, **25(3)**, 217–234 (1997).
2. Interaction Studies of Vinylchloride with Liquid Foods by Gas Chromatography, **D. Gavril**, G. Karaiskakis, *Chromatographia*, **47(½)**, 63–71 (1998).

3. Conversions of Carbon Monoxide Oxidation over Pt–Rh Alloy Catalysts Calculated by a New Gas Chromatographic Technique, **D. Gavril**, A. Koliadima, G. Karaiskakis, *Chromatographia*, **49(5/6)**, 285–292 (1999).
4. Study of the Sorption of Carbon Monoxide, Oxygen and Carbon Dioxide on Pt–Rh Alloy Catalysts by a New Gas Chromatographic Methodology, **D. Gavril**, G. Karaiskakis, *J. Chromatogr. A*, **845**, 67–83 (1999).
5. Gas Chromatographic Kinetic Study of Carbon Monoxide Oxidation over Platinum–Rhodium Catalysts, **D. Gavril**, N.A. Katsanos, G. Karaiskakis, *J. Chromatogr. A*, **852**, 507–523 (1999).
6. Adsorption Studies of Gases on Pt–Rh Bimetallic Catalysts By Reversed Flow Gas Chromatography, **D. Gavril**, A. Koliadima, G. Karaiskakis, *Langmuir*, **15**, 3798–3806 (1999).
7. Study of Hydroxyapatite Aggregation in the Presence of Potassium Phosphate by Centrifugal Sedimentation Field–Flow Fractionation, A. Athanasopoulou, **D. Gavril**, A. Koliadima, G. Karaiskakis, *J. Chromatogr. A.*, **845**, 293–302 (1999).
8. Investigation of the Coagulation and Adhesion Phenomena in Colloids by Field–Flow Fractionation, A. Koliadima, **D. Gavril**, G. Karaiskakis, *J. Liq. Chrom. & Rel. Technol.*, **22(18)**, 2779–2793 (1999).
9. Size Analysis of Barley Starch Granules by Sentimentation/Steric Field Flow Fractionation, L. Farmakis, J. Sakellaraki, A. Koliadima, **D. Gavril** and G. Karaiskakis, *Starch/Starke*, **52**, 275–282 (2000).
10. Study of the Mechanism of the Interaction of Vinylchloride with Water by Reversed–Flow Gas Chromatography, **D. Gavril**, K.A. Rashid, G. Karaiskakis, *J. Chromatogr. A*, **919**, 349–356 (2001).
11. Flux of Gases across the Air–Water Interface studied by Reversed Flow Gas Chromatography, K.A. Rashid, **D. Gavril**, N.A. Katsanos, G. Karaiskakis, *J. Chromatogr. A*, **934**, 31–49 (2001).
12. New Methodology for the Measurement of Diffusion Coefficients of Pure Gases into Gas Mixtures, K.A. Rashid, **D. Gavril**, G. Karaiskakis, *Instrum. Sci. & Technol.*, **30(1)**, 67–78 (2002).
13. Reversed Flow Gas Chromatography: A Tool for Instantaneous Monitoring of the Concentrations of Reactants and Products in Heterogeneous Catalytic Processes, **D. Gavril\***, *J. Liq. Chrom. & Rel. Technol.*, **25(13–15)**, 2079–2099 (2002–Invited article).

14. Potential–Barrier Field–Flow Fractionation: Potential Curves and Interactive Forces, G. Karaiskakis, A. Koliadima, L. Farmakis and **D. Gavril**, *J. Liq. Chrom. & Rel. Technol.*, **25(13–15)**, 2153–2172 (2002).
15. An Inverse Gas Chromatographic Tool for the Measurement of Local Isotherms on Heterogeneous Surfaces, **D. Gavril\***, *Instrum. Sci. & Technol.*, **30(4)**, 409–425 (2002).
16. Time – Resolved Determination of Surface Diffusion Coefficients for Physically Adsorbed or Chemisorbed Species on Heterogeneous Surfaces, by Inverse Gas Chromatography. N.A. Katsanos, **D. Gavril**, and G. Karaiskakis, *J. Chromatogr. A*, **983(1–2)**, 177–193 (2003).
17. A new Gas Chromatographic Methodology for the estimation of the composition of Binary Gas Mixtures, K.A. Rashid, **D. Gavril** and G. Karaiskakis, *J. Chrom. Sci.*, **41(3)**, 123–132 (2003).
18. An Inverse Gas Chromatographic Instrumentation for the Study of Carbon Monoxide's Adsorption on Rh/SiO<sub>2</sub>, under Hydrogen-rich Conditions, V. Loukopoulos, **D. Gavril\*** and G. Karaiskakis, *Instrum. Sci. & Technol.*, **31(2)**, 165–181 (2003).
19. Study of the Influence of Surfactants on the Transfer of Gases into Liquids by Inverse Gas Chromatography, K.R. Atta, **D. Gavril**, V. Loukopoulos and G. Karaiskakis, *J. Chromatogr. A*, **1023**, 287–296 (2004).
20. Surface Energy of Solid Catalysts Measured by Inverse Gas Chromatography, N.A. Katsanos, **D. Gavril**, J. Kapolos and G. Karaiskakis, *J. Colloid. Interf. Sci.*, **270(2)**, 455–461 (2003).
21. Determination of Collision Cross Sectional Parameters from Experimentally Measured Gas Diffusion Coefficients, **D. Gavril\***, K.A. Rashid and G. Karaiskakis, *Fluid Phase Equil.*, **218**, 177–188 (2004).
22. Determination of Diffusion Coefficients by Gas Chromatography (Review), G. Karaiskakis, **D. Gavril**, *J. Chromatogr. A*, **1037**, 147–189 (2004–under invitation).
23. Study of CO Dissociative Adsorption over Pt and Rh catalysts by Inverse Gas Chromatography, **D. Gavril\***, V. Loukopoulos and G. Karaiskakis, *Chromatographia*, **59(11)**, 721–729 (2004).
24. Investigation of the Surface Heterogeneity of Solids from Reversed Flow Inverse Gas Chromatography, **D. Gavril\***, B.E. Neuwenhuys, *J. Chromatogr. A*, **1045(1–2)**, 161–172 (2004).

25. Gas Chromatographic Investigation of the Competition between Mass Transfer and Kinetics on a Solid Catalyst, V. Loukopoulos, **D. Gavril**, G. Karaiskakis and N.A. Katsanos, *J. Chromatogr. A*, **1051(1)**, 55–73 (2004).
26. Inverse Gas Chromatographic Investigation of the Effect of Hydrogen in Carbon Monoxide Adsorption over Silica Supported Rh and Pt–Rh Alloy Catalysts, under Hydrogen–Rich Conditions, **D. Gavril\***, V. Loukopoulos, A. Georgaka, A. Gabriel, G. Karaiskakis, *J. Chromatogr. A*, **1087(1–2)** 158–168 (2005).
27. Investigation of the determination of diffusion coefficients of gases into liquids from reversed-flow gas chromatography, **D. Gavril\***, A. Gabriel, *Instrum. Sci. & Technol.*, **34(4)** 435-454 (2006).
28. A Precise Gas Chromatographic Methodology for the Study of the Evaporation, **D. Gavril\***, K.A. Rashid, G. Karaiskakis, *AIChE J*, **52(7)** 2381-2390 (2006).
29. Time distribution of Adsorption Entropy of Gases on Heterogeneous Surfaces by Inverse Gas Chromatography, N.A. Katsanos, J. Kapolos, **D. Gavril**, N. Bakaoukas, V. Loukopoulos, A. Koliadima, G. Karaiskakis, *J. Chromatogr. A*, **1127(1-2)** 221-227 (2006).
30. On the mechanism of selective CO oxidation on nanosized Au/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> catalysts, **D. Gavril\***, A. Georgaka, V. Loukopoulos, G. Karaiskakis, B. Nieuwenhuys, *Gold Bulletin* **39(4)** 192-199 (2006).
31. Inverse Gas Chromatographic Investigation of the Active Sites Related to CO Adsorption over Rh/SiO<sub>2</sub> Catalysts in Excess of Hydrogen, **D. Gavril\***, A. Georgaka, V. Loukopoulos, G. Karaiskakis, *J. Chromatogr. A*, **1160** 289–298 (2007).
32. Gas Chromatographic Investigation of the Effects of Hydrogen and Temperature on the Nature of the Active Sites Related to CO Adsorption on Nanosized Au/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub>, **D. Gavril\***, A. Georgaka, V. Loukopoulos, G. Karaiskakis, *J. Chromatogr. A*, **1164 (1-2)** 271-280 (2007).
33. Inverse Gas Chromatographic Study of the Factors Affecting Surface Diffusivity of Gases over Heterogeneous Solids, **D. Gavril\***, R.A. Khan, *Instrum. Sci. & Technol.*, **36(1)** 56-70 (2008).
34. H<sub>2</sub> and CO<sub>2</sub> coadsorption Effects in CO Adsorption over Nanosized Au/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Catalysts, A. Georgaka, **D. Gavril\***, V. Loukopoulos, G. Karaiskakis, B. Nieuwenhuys, *J. Chromatogr. A*, **1205 (1-2)** 128-136 (2008).
35. Surface studies by reversed-flow inverse gas chromatography: A review, **D. Gavril\***, *Catal. Today*, **154(1-2)** 149-159 (2010–Invited article).

36. Kinetic study of oxygen adsorption over nanosized Au/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> supported catalysts, under selective CO oxidation conditions, **D. Gavril\***, A. Georgaka, G. Karaiskakis, *Molecules*, **17**, 4878-4895 (2012–**Invited article**).
37. CO oxidation on nanosized Au/Al<sub>2</sub>O<sub>3</sub> by surface hydroxyl groups and in the absence of O<sub>2</sub>, studied by inverse gas chromatography, **D. Gavril\***, *Catal. Today*, **244**, 36-46 (2015–**Invited article**).
38. An inverse gas chromatographic methodology for studying gas-liquid mass transfer, A. Paloglou, K. Martakidis, **D. Gavril\***, *J. Chromatogr. A*, **1480**, 83-92 (2017).
39. Optimization of a microcontroller for the simultaneous logging of temperature and reversed-flow inverse gas chromatography measurements, K. Martakidis, **D. Gavril\***, *Instrum. Sci. & Technol.*, **46(2)** 222-244 (2018).
40. A new inverse gas chromatographic methodology for studying mass transfer caused by the evaporation of volatile liquids K. Martakidis, **D. Gavril\***, *Instrum. Sci. & Technol.*, **47(4)**, 389-409 (2019).
41. Determination of Dichlorodifluoromethane's Diffusion Coefficients in Hydrogen, Helium, Nitrogen and Air by Reversed-Flow Inverse Gas Chromatography. K. Martakidis, **D. Gavril\***, *J. Chem. Eng. Data*, **64**, 2429-2435 (2019).
42. Extending the study of mass transport across the gas-liquid interface by reversed-flow gas chromatography, K. Martakidis, **D. Gavril\***, *J. Chromatogr. A*, **1605**, 460370 (2019).

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