Dr. Tadeusz Górecki

Professor, Chemistry, University of Waterloo

From adapting passive gas sampling in polluted soils to speeding up extractions of chemicals from contaminated rock, Tadeusz Górecki has made a career of analyzing some of nature's most complex samples. He is best known though for his improvements to comprehensive two-dimensional gas chromatography, a much more sensitive, two-step version of gas chromatography that allows researchers to fully resolve analyte peaks in messy environmental and biological samples.

Tadeusz Górecki is the recipient of the 2016 Andrzej Waksmundzki Medal, awarded by the Committee on Analytical Chemistry of the Polish Academy of Sciences and the 2017 Lifetime Scientific Achievement Award granted by the International GCxGC Symposium held in Fort Worth (TX).

Expertise

- Comprehensive two-dimensional gas chromatography (GCxGC)
- High performance liquid chromatography (HPLC)
- Passive sampling
- Enhanced extraction techniques
- Indoor air quality analysis
- Environmental analysis
- Pyrolysis GC/MS

Tadeusz Górecki's research focuses on analytical processes. Recent developments include the development of several new modulators for comprehensive two-dimensional gas chromatography (GC×GC), studies on the fundamental aspects of GC×GC and LC×LC, development of efficient, green methods for high-performance liquid chromatography, a passive sampling method that allows sampler calibration to be carried out based on the physico-chemical properties of the analytes, mathematical modelling of the passive sampler, and extraction methods for volatile organic compounds (VOCs) in low-permeability matrices that dramatically reduce the extraction time.

Recent patents

- T.A. McAlary, H. Groenevelt, S. Seethapathy, T. Górecki, "Low-uptake Waterloo Membrane Sampler for quantitative passive soil vapor concentration measurement", US Patent no. 9399912, issued July 26, 2016.
- T. Górecki, J. Poerschmann, "System for in-column pyrolysis", German Patent DE 101 11 854.6, granted October 18, 2001.

Awards and Distinctions

- European Union Marie Curie Fellowship, 2019
- GCxGC Lifetime Achievement Award, 2017
- Andrzej Waksmundzki Medal from the Polish Academy of Sciences, 2016
- Best poster award, 37th International Symposium on Chromatography and 10th GCxGC Symposium, Palm Springs, CA, USA, May 12-16, 2013
- Best poster award, 36th International Symposium on Chromatography and 9th GCxGC Symposium, Riva del Garda, Italy, May 27-June 1, 2012
- Professor of Chemical Sciences, degree conferred by the President of the Republic of Poland, 2009
- Best poster award, Dalian International Symposia and Exhibition on Chromatography, Dalian, China, June 4-7, 2007

Selected Papers

Selected Publications

F. Salim, M. Ioannidis, A. Penlidis, T. Górecki, "A simple Method for Modelling the Sampling Process in a Permeation Passive Sampler with Various Types of Adsorbents: Consideration of Intra-Particle Resistance to Mass Transfer and Comprehensive Sensitivity Analysis", Environmental Science: Processes and Impacts, 21 (2019) 469 - 484.

F. Salim, T. Górecki, M. Ioannidis, "New applications of the mathematical model of a permeation passive sampler: uptake rate correction and storage stability", Environmental Science: Processes and Impacts, 21 (2019) 113 - 123

A. Muscalu, T. Górecki, "Comprehensive Two-Dimensional Gas Chromatography in Environmental Analysis", TrAC – *Trends in Analytical Chemistry*, 106 (**2018**) 225-245.

H.-Y. Chow, T. Górecki, "Temperature Programming of the Second Dimension in Comprehensive Two-Dimensional Gas Chromatography", *Analytical Chemistry*, 89 (16) (**2017**), 8207–8211.

F. Salim, M. Ioannidis, T. Górecki, "Experimentally Validated Mathematical Model of Analyte Uptake by Permeation Passive Samplers", *Environmental Science: Processes and Impacts*, 19 (**2017**), 1363- 1373.

A.M. Muscalu, D. Morse, E.J. Reiner, T. Górecki, "The Quantification of Short Chain Chlorinated Paraffins in Sediment Samples Using Comprehensive Two-Dimensional Gas Chromatography with μECD Detection", Analytical and Bioanalytical Chemistry, 409(8) (2017), 2065–2074.

O. Goli, T. Górecki, H.T. Mugammar, M. Marchesi, R. Aravena, "Evaluation of the Suitability of the Waterloo Membrane Sampler for Sample Preconcentration before Compound-Specific Isotope Analysis", Environmental Technology & Innovation, 7 (2017), 141–151.

A. Mostafa, T. Górecki, "Development and design of a new single-stage cryogenic modulator for comprehensive two dimensional gas chromatography (GC×GC)", Analytical Chemistry, 88 (10), (2016)