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## Forskningsområde

Massespektrometri til analyse af kemiske og biologiske processer i real-tid, herunder udvikling af miniaturiserede bærbare massespektrometre til analyse i felten.

Massespektrometriske metoder til karakterisering af nano-materialer

## Uddannelse

1986Cand. Scient. (Fysik), Fysisk Institut, Odense Universitet, Danmark  
1990Ph.D. (Biokemi), Biokemisk Institut, Odense Universitet, Danmark  
2001Dr.Scient. (Massespektrometri), Syddansk Universitet

## Ansættelser:

Sep. 1990 - Feb. 1991 -:- Postdoc, Biokemisk Institut, Odense Universitet.

Mar. 1991- Maj 1992 -:- Visiting scientist, Department of Chemistry, Purdue University, Indiana, USA.

Jan. 1992 - Aug. 1995 -:- Adjunkt, Biokemisk Institut, Odense Universitet

Sep. 1995 - Dec. 2003 -:- Lektor, Biokemisk Institut, Syddansk Universitet

Jan 2004 – Mar. 2009 -:- Professor, Kemisk Institut, Københavns Universitet

Mar 2009 – Feb. 2012 -:- Professor, Institut for Farmaci og Analytisk Kemi, Københavns Universitet

Mar 2012 - Mar 2021 - - - Institutleder, Institut for Fysik, Kemi og Farmaci, Syddansk Universitet

Mar 2021 - - - - Professor, Institut for Fysik, Kemi og Farmaci, Syddansk Universitet

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1995 - - - - Etablerer konsulentvirksomheden MIMS Systems som i samarbejde med Mikrolab Aarhus A/S sælger og udvikler specialbyggede massespektrometre til overvågningsopgaver.

## Tillidshverv

Sep. 1992 - Apr. 1993 -:- Naturvidenskabeligt Fakultetsråd, Odense University.

Jan. 1993 - Dec. 1994 -:- Bestyrelsen, Centre for Process Biotechnology, Danmarks Tekniske Universitet

Jan. 2000 - Nov. 2003 -:- Bestyrelsen, Centre for Water Quality Sensors, Institute for Water and Environment, Aarhus, Danmark

Jan. 2000 - Nov. 2003 -:- Naturvidenskabeligt Fakultetsrådet, Syddansk Universitet

Jan. 2003 - Dec. 2003 -:- Bestyrelsen, Institut for Biokemi og Molekylær Biologi, Syddansk Universitet

Oct. 2003 - Oct. 2006 -:- Formand, Dansk Selskab for Analytisk Kemi

Maj 2006 – Mar. 2009 -:- Naturvidenskabeligt Fakultetsråd, Københavns Universitet

Maj 2014 - -:- Bestyrelsesmedlem Tornbjerg Gymnasium, Odense

Maj 2016 - -:- Bestyrelsesformand Tornbjerg Gymnasium, Odense

Mar 2019 - Mar 2021 -:- Bestyrelsesmedlem Mejeribrugets Forsknings Fond

## Publikationer

### **Membrane inlet mass spectrometry (MIMS) for analysis of water disinfection byproducts: Recent advances**

Allard, S. & Lauritsen, F. R., aug. 2023, I: TrAC Trends in Analytical Chemistry. 165, 8 s., 117141.

### **MIMS as a low-impact tool to identify pathogens in water**

Sajid, S., Aryal, I., Chaudhri, S. F., Lauritsen, F. R., Jørgensen, M. G., Jenssen, H. & Prabhala, B. K., 2023, I: Water (Switzerland). 15, 1, 184.

### **An experimental laboratory reactor for quantitative kinetic studies of disinfection byproduct formation using membrane inlet mass spectrometry**

Larsen, F. T., McPherson, J. N., McKenzie, C. J. & Lauritsen, F. R., 30. aug. 2022, I: Rapid Communications in Mass Spectrometry. 36, 16, s. e9339 10 s., e9339.

### **Identification and quantification of chloramines, bromamines and bromochloramine by Membrane Introduction Mass Spectrometry (MIMS)**

Hu, W., Lauritsen, F. R. & Allard, S., 10. jan. 2021, I: Science of the Total Environment. 751, 8 s., 142303.

### **Directing a Non-Heme Iron(III)-Hydroperoxide Species on a Trifurcated Reactivity Pathway**

Wegeberg, C., Lauritsen, F. R., Frandsen, C., Mørup, S., Browne, W. R. & McKenzie, C., 2018, I: Chemistry - A European Journal. 24, 20, s. 5134-5145

### **Interactions between nanoparticles and lung surfactant investigated by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry: Interactions between nanoparticles and lung surfactants**

Chhoden, T., Clausen, P. A., Larsen, S. T., Nørgaard, A. W. & Lauritsen, F. R., 2015, I: Rapid Communications in Mass Spectrometry. 29, 11, s. 1080-1086

### **Portable electrospray ionization mass spectrometry (ESI-MS) for analysis of contaminants in the field**

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### **Rapid screening of drug compounds in urine using a combination of microextraction by packed sorbent and rotating micropillar array electrospray ionization mass spectrometry**

Nielsen, K., Lauritsen, F. R., Nissilä, T. & Ketola, R. A., 2012, I: Rapid Communications in Mass Spectrometry. 26, 3, s. 297-303

### **Linking Soil O<sub>2</sub>, CO<sub>2</sub>, and CH<sub>4</sub> Concentrations in a Wetland Soil: Implications for CO<sub>2</sub> and CH<sub>4</sub> Fluxes**

Elberling, B., Jensen, L. A., Jørgensen, C. J., Joensen, H. P., Köhl, M., Glud, R. N. & Lauritsen, F. R., 15. apr. 2011, I: Environmental Science & Technology (Washington). 45, 8, s. 3393-3399 7 s.

### **Characterization of a capillary spray cell for easy analysis of extracts of biological samples**

Janfelt, C. & Lauritsen, F. R., 2011, I: International Journal of Mass Spectrometry. 299, s. 178-183

### **Nebulization ionization and desorption ionization analysis of reactive organofunctionalized silanes in nanofilm products**

Nørgaard, A. W., Janfelt, C., Benassi, M., Wolkoff, P. & Lauritsen, F. R., 2011, I: Journal of Mass Spectrometry. 46, 4, s. 402-410

### **Characterization of nanofilm spray products by mass spectrometry**

Nørgaard, A. W., Wolkoff, P. & Lauritsen, F. R., 2010, I: Chemosphere. 80, s. 1377-1386

### **Fast and direct recognition of the active ingredients in tablets using hot cell membrane inlet mass spectrometry**

Lauritsen, F. R. & Nielsen, K., 2010, I: International Journal of Mass Spectrometry. 295, s. 119-123

On-line monitoring of the dynamics of trihalomethane concentrations in a warm public swimming pool using an unsupervised membrane inlet mass spectrometry system with off-site real-time surveillance  
Kristensen, G. H., Klausen, M. M., Hansen, V. A. & Lauritsen, F. R., 2010, I: Rapid Communications in Mass Spectrometry. 24, 1, s. 30-34

Real-time monitoring of the progress of polymerization reactions directly on surfaces at open atmosphere by ambient mass spectrometry  
Nørgaard, A. W., Vaz, B. G., Lauritsen, F. R. & Eberlin, M. N., 2010, I: Rapid Communications in Mass Spectrometry. 24, s. 3441-3446

**Soil heterogeneity effects on O<sub>2</sub> distribution and CH<sub>4</sub> emissions from wetlands: *In situ* and mesocosm studies with planar O<sub>2</sub> optodes and membrane inlet mass spectrometry**  
Jensen, L. A., Elberling, B., Glud, R. N., Kühl, M., Lauritsen, F. R. & Joensen, H. P., 2010, I: Soil Biology & Biochemistry. 42, 12, s. 2254-2265

Analysis of semivolatile pharmaceuticals and pollutants in organic micro extracts using hot cell membrane inlet mass spectrometry  
Chen, H., Xia, Z., Pedersen-Bjergaard, S., Svensmark, B. & Lauritsen, F. R., 2009, I: Analytical Chemistry. 81, 10, s. 4010-4014

In situ identification of dimethyl diselenide in hepatocytes treated with methylseleninic acid by membrane inlet mass spectrometry  
Gabel-Jensen, C., Bak, S. A., Lauritsen, F. R., Hansen, H. R., Badolo, L. & Gammelgaard, B., 2009, I: Journal of Analytical Atomic Spectrometry. 24, s. 949-952

Release of VOCs and particles during use of nanofilm spray products  
Nørgaard, A. W., Jensen, K. A., Janfelt, C., Lauritsen, F. R., Clausen, P. A. & Wolkoff, P., 2009, I: Environmental Science & Technology (Washington). 43, 20, s. 7824-7830

Characterization and optimization of membrane inlets for a miniature ion trap mass spectrometer operating at a high background pressure of humid air  
Janfelt, C., Graesboll, R. & Lauritsen, F. R., 2008, I: International Journal of Mass Spectrometry. 276, s. 17-23 7 s.

Characterization of proton-bound acetate dimers in ion mobility-spectrometry  
Pedersen, C. S., Lauritsen, F. R., Sysoev, A., Viitanen, A-K., Makelä, J., Adamov, A., Laakia, J., Mauriala, T. & Kotiaho, T., 2008, I: Journal of the American Society for Mass Spectrometry. 19, s. 1361-1366 6 s.

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Method for quantification of chemicals in a pollution plume using a moving membrane-based sensor exemplified by mass spectrometry  
Janfelt, C., Lauritsen, F. R., Toler, S. K., Bell, R. J. & Short, R. T., 15. jul. 2007, I: Analytical Chemistry. 79, 14, s. 5336-5342

Fast and direct screening of polyaromatic hydrocarbon (PAH)-contaminated sand using a miniaturized membrane inlet mass spectrometer (mini-MIMS)  
Frandsen, H., Janfelt, C. & Lauritsen, F. R., 2007, I: Rapid Communications in Mass Spectrometry. 21, 10, s. 1574-1578 5 s.

Characterization of a mini membrane inlet mass spectrometer for on-site detection of contaminants in both aqueous and liquid organic samples  
Janfelt, C., Frandsen, H. & Lauritsen, F. R., 2006, I: Rapid Communications in Mass Spectrometry. 20, s. 1441-1446 6 s.

**On-line monitoring of CO<sub>2</sub> production in *Lactococcus lactis* during physiological pH decrease using membrane inlet mass spectrometry with dynamic pH calibration**

Andersen, A. Z., Lauritsen, F. R. & Olsen, L. F., 2005, I: *Biotechnology and Bioengineering*. 92, 6, s. 740-747

**Catabolism of leucine to branched-chain fatty acids in *Staphylococcus xylosus***

Beck, H. C., Hansen, A. M. & Lauritsen, F. R., maj 2004, I: *Journal of Applied Microbiology*. 96, 5, s. 1185-1193

**On-line monitoring of important organoleptic methyl-branched aldehydes during batch fermentation of starter culture *Staphylococcus xylosus* reveal new insight into their production in a model fermentation**

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**Sustained glycolytic oscillations - No need for cyanide, FEMS**

Poulsen, A. K., Lauritsen, F. R. & Olsen, L. F., 2004, I: *FEMS Microbiology Letters*. 236, s. 261-266

**Novel pyrazine metabolites found in polymyxin biosynthesis by *Paenibacillus polymyxa***

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**Metabolite production and kinetics of branched-chain aldehyde oxidation in *Staphylococcus xylosus***

Beck, H. C., Hansen, A. M. & Lauritsen, F. R., 1. jul. 2002, I: *Enzyme and Microbial Technology*. 31, 1-2, s. 94-101

**Determination of pentachlorophenol by negative ion chemical ionization with membrane introduction mass spectrometry**

Blake, T. A., Zheng, X., Aggerholm, T., Lauritsen, F. R. & Cooks, R. G., 2002, I: *Analyst*. 11, s. 1463-66

**Membrane inlet mass spectrometry**

Kotiaho, T. & Lauritsen, F. R., 2002, I: *Comprehensive Analytical Chemistry*. XXXVII, s. 531-57

**Direct detection of polyaromatic hydrocarbons, estrogenic compounds and pesticides in water using desorption chemical ionization MIMS**

Aggerholm, T. & Lauritsen, F. R., 2001, I: *Rapid Communications in Mass Spectrometry*. 15, s. 1826-31

**Melatonin activates the peroxidase-oxidase reaction and promotes oscillations**

Olsen, L. F., Lunding, A., Lauritsen, F. R. & Allegra, M., 2001, I: *Biochemical and Biophysical Research Communications*. 284, s. 1071-76

**Chloroform in a Pristine Aquifer System: Toward an Evidence of Biogenic Origin**

Laternus, F., Lauritsen, F. R. & Grøn, C., 2000, I: *Water Resources Research*. 36, s. 2999-3009

**Determination of Steroid Hormones by Membrane Inlet Mass Spectrometry and Desorption Chemical Ionization**

Lauritsen, F. R. & Rose, J., 2000, I: *Analyst*. 125, s. 1577-1581

**Direct Detection of Large Fat-Soluble Biomolecules Using Membrane Inlet Mass Spectrometry and Desorption Chemical Ionization**

Lauritsen, F. R., Mendes, M. A. & Aggerholm, T., 2000, I: *Analyst*. 125, s. 211-215

**Occurrence and formation of chloroform at danish forest sites**

Haselmann, K. F., Ketola, R. A., Laternus, F., Lauritsen, F. R. & Grøn, C., 2000, I: *Atmospheric Environment*. 34, s. 187-9

**Detection of dicarboxylic acids in aqueous samples using membrane inlet mass spectrometry with desorption chemical ionization**

Ketola, R. A. & Lauritsen, F. R., 1999, I: *Rapid Communications in Mass Spectrometry*. 13, s. 749-751

**A study of the Bioconversion Potential of the Fungus *Bjerkandera adusta* with Respect to a Production of Chlorinated Aromatic Compounds**

Lauritsen, F. R. & Lunding, A., 1998, I: Enzyme and Microbial Technology. 22, s. 459-465

**Classification of Cola Beverages on the Basis of Mass Spectra Measured by Membrane Inlet Mass Spectrometry**

Ketola, R., Heikkonen, J., Piepponen, S., Lauritsen, F. R. & Kotiaho, T., 1998, I: Rapid Communications in Mass Spectrometry. 12, s. 1011-1017

**Direct Characterization of Bioconversion Processes Using Membrane Inlet Mass Spectrometry**

Lauritsen, F. R. & Lunding, A., 1998, I: Advances in Mass Spectrometry. 14, s. 575-582

**Temperature Programmed Desorption for Membrane Inlet Mass Spectrometry**

Ketola, R., Grøn, C. & Lauritsen, F. R., 1998, I: Rapid Communications in Mass Spectrometry. 12, s. 773-778

**Quantitative Determination of Semi-volatile Organic Compounds in Solution Using Trap-and-Release Membrane Inlet Mass Spectrometry**

Lauritsen, F. R. & Ketola, R., 1997, I: Analytical Chemistry. 69, s. 4917-4922

**Metabolism of halogenated compounds in the white rot fungus *Bjerkandera adusta* studied by membrane inlet mass spectrometry and tandem mass spectrometry**

Beck, H. C., Lauritsen, F. R., Patrick, J. S. & Cooks, R. G., 5. jul. 1996, I: Biotechnology and Bioengineering. 51, 1, s. 23-32

**Advances in Membrane Inlet Mass Spectrometry**

Lauritsen, F. R. & Kotiaho, T., 1996, I: Reviews Analytical Chemistry. 15, s. 237-264

**Biodegradation of cis-1,2-dichloro-ethylene at low concentrations in a methane-oxidizing biofilm**

Archangeli, J. P., Mejlhede, M., Arvin, E. & Lauritsen, F. R., 1996, I: Water Research. 30, s. 1885-1893

**Metabolism of halogenated Compounds in the Fungus *Bjerkandera adusta* Studied by membrane Inlet Mass Spectrometry and Tandem mass Spectrometry**

Beck, H. C., Lauritsen, F. R., Patrick, J. S. & Cooks, R. G., 1996, I: Biotechnology and Bioengineering. 51, s. 23-32

**Time and Concentration Dependent Relative Peak Intensities Observed in EI-Membrane Inlet Mass Spectra**

Hansen, K., Gylling, S. & Lauritsen, F. R., 1996, I: International Journal of Mass Spectrometry and Ion Processes. 152, s. 143-155

**A Fully Integrated Trap-Membrane Inlet Mass Spectrometry System for the Measurement of Semivolatile Organic Compounds in Aqueous Solution**

Leth, M. & Lauritsen, F. R., 1995, I: Rapid Communications in Mass Spectrometry. 9, s. 591-596

**Direct Determination of Styrene and tetrachloroethylene in Olive Oil by Membrane Inlet Mass Spectrometry**

Kotiaho, T., Gylling, S., Lunding, A. & Lauritsen, F. R., 1995, I: Journal of Agricultural and Food Chemistry. 43, s. 928-930

**Membrane Inlet Ion Mobility Spectrometry for the On-Line Monitoring of Fermentation Processes**

Kotiaho, T., Lauritsen, F. R., Degn, H. & Paakkanen, H., 1995, I: Analytica Chimica Acta. 309, s. 317-325

**On-line Monitoring of Biological Reactions at Low Part Per Trillion Levels by Membrane Inlet Mass Spectrometry**

Lauritsen, F. R. & Gylling, S., 1995, I: Analytical Chemistry. 67, s. 1418-1420

**An On-Line Sampling System for Fermentation Monitoring Using Membrane Inlet Mass Spectrometry (MIMS). Application to Phenoxyacetic Acid Monitoring in Penicillin Fermentation**

Hansen, K., Lauritsen, F. R. & Degn, H., 1994, I: Biotechnology and Bioengineering. 44, s. 347-353

**Direct Detection of Volatile Metabolites Produced by Microorganisms using Membrane Inlet Mass Spectrometry**

Lauritsen, F. R. & Lloyd, D., 1994, I: American Chemical Society Book Series. 541, s. 91-106

**Jet Separator/Membrane Introduction Mass Spectrometry for On-Line Quantitation of Volatile Organic Compounds in Aqueous Solution**

Lindy, D., Bauer, S., Cooks, R. G., Lauritsen, F. R., Kotiaho, T. & Graf, T., 1993, I: Rapid Communications in Mass Spectrometry. 7, s. 935-942

**Rapid and Direct Monitoring of Volatile Fermentation Products in the Fungus *Bjerkandera adusta***

Lauritsen, F. R. & Kotiaho, T., 1993, I: Biological Mass Spectrometry. 22, s. 485-489

**Direct detection and identification of volatile organic compounds dissolved in organic solvents by reversed phase membrane introduction tandem mass spectrometry**

Lauritsen, F. R., Kotiaho, T., Choudhury, TK. & Cooks, R. G., 1. jun. 1992, I: Analytical Chemistry. 64, 11, s. 1205-1211

**Microporous Membrane Introduction Mass Spectrometry with Solvent Chemical Ionization and Glow Discharge for the Direct Detection of Volatile Organic Compounds in Aqueous Solution**

Lauritsen, F. R., Choudhury, T. K., Dejarme, L. & Cooks, R. G., 1992, I: Analytica Chimica Acta. 266, s. 1-12

**identification of Dissolved Volatile Metabolites in Microbial Cultures by Membrane Inlet Mass Spectrometry**

Lauritsen, F. R., Nielsen, L., Degn, H., Lloyd, D. & Bohatka, S., 1991, I: Biological Mass Spectrometry. 20, s. 253-258

**Membrane Introduction Mass Spectrometry**

Kotiaho, T., Lauritsen, F. R., Choudhury, T. K., Cooks, R. G. & Tsao, G., 1991, I: Analytical Chemistry. 63, 18, s. 875A-883A

**The Parasitic Flagellates *Trichomonas vaginalis* and *Tritrichomonas foetus* Produce Indole and Demethyl Sulphide: Direct Characterization by Membrane Inlet Mass Spectrometry**

Lloyd, D., Lauritsen, F. R. & Degn, H., 1991, I: Journal of General and Applied Microbiology. 137, s. 1743-1747

**A Membrane Inlet Tandem Mass Spectrometer for Continuous Monitoring of Volatile Organic Compounds**

Lauritsen, F. R., Bohatka, S. & Degn, H., 1990, I: Rapid Communications in Mass Spectrometry. 4, s. 401-403

**A New membrane Inlet for On-Line Monitoring of Dissolved, Volatile Organic Compounds with Mass Spectrometry**

Lauritsen, F. R., 1990, I: International Journal of Mass Spectrometry and Ion Processes. 95, s. 259-268

**Gas-Exchange rates in the Belousov-Zhabotinski Reaction Determined with membrane Inlet Mass Spectrometry**

Lauritsen, F. R. & Degn, H., 1989, I: The Journal of Physical Chemistry. 93, s. 2781-2783

**Tinplates and Tin/Chromium Interfaces Studied by Electron Spectroscopies**

Lauritsen, F. R., Onsgaard, J. & Vinterne, H., 1988, I: Surface and Interface Analysis. 12, s. 198-220