Volume 1130

Fluorescence Methods and Applications: Spectroscopy, Imaging, and Probes

Editor Otto S. Wolfbeis

This volume is the result of the 10th Conference on Methods and Applications of Fluorescence: Spectroscopy, Imaging, and Probes held September 9-12, 2007 at the Salzburg Congress Center, Salzburg, Austria.

CONTENTS	
Preface. By Otto S. Wolfbeis	xi
Part I. Fluorescence in High-Throughput Screening	
Single-bead, Single-molecule, Single-cell Fluorescence: Technologies for Drug Screening and Target Validation. By Martin Hintersteiner and Manfred Auer	1
Substrate Arrays for Fluorescence-Based Enzyme Fingerprinting and High-Throughput Screening. By Jean-Louis Reymond	12
Part II. Fluorescence Spectroscopy	
Probing the Interior of Living Cells with Fluorescence Correlation Spectroscopy. By Matthias Weiss	21
Fluorescence Measurements on Functionalized Polymer Surfaces – Problems and Troubleshooting. By Katrin Hoffmann, Renate Mix. Ute Resch-Genger, and Joerg F. Friedrich	28

Standardization of Fluorescence Measurements: Criteria for the Choice of Suitable Standards and Approaches to Fit-for-Purpose Calibration Tools. By Ute Resch-Genger, Katrin Hoffmann, and Angelika Hoffmann	35
Investigating Transcriptional Regulation by Fluorescence Spectroscopy, from Traditional Methods to State-of-the-Art Single-Molecule Approaches. By Silvia Zorrilla, M. Pilar Lillo, Denis Chaix, Emmanuel Margeat, Catherine A. Royer, and Nathalie Declerck	44
Subpicosecond Transient Signal Spectroscopy of Prodan in Dimethylformamide Solution. By János Erostyák, Pasi Myllyperkiö, Andrea Buzády, and Jouko Korppi-Tommola	52
Frequency Domain Fluorometry with Pulsed Light-Emitting Diodes. By Petr Herman and Jaroslav Vecer	56
Toward Single-metal-ion Sensing by Förster Resonance Energy Transfer. By Jens U. Sutter, Alexander Macmillan, David J. S. Birch, and Olaf J. Rolinski	62
Fluorescence Interferometry: Principles and Applications in Biology. By Alberto Bilenca, Jing Cao, Max Colice, Aydogan Ozcan, Brett Bouma, Laurel Raftery, and Guillermo Tearney	68
Acoustically Levitated Droplets: A Contactless Sampling Method for Fluorescence Studies. By Jork Leiterer, Markus Grabolle, Knut Rurack, Ute Resch-Genger, Jan Ziegler, Thomas Nann, and Ulrich Panne	78
Structural Effects of Biologically Relevant Rhodamines on Spectroscopy of Fluorescence Fluctuations. By José A. B. Ferreira	85
Part III. Fluorescence Imaging	
Dextrin-Microencapsulated Porphyrin: Luminescent Properties. By Priscilla Paiva Luz, Cláudio Roberto Neri, and Osvaldo Antonio Serra	91
Luz, Cláudio Roberto Neri, and Osvaldo Antonio Serra Lanthanide Bimetallic Helicates for <i>in Vitro</i> Imaging and Sensing. <i>By</i> Jean-Claude G. Bünzli, Anne-Sophie Chauvin, Caroline D.B. Vandevyver, Song Bo,	
Luz, Cláudio Roberto Neri, and Osvaldo Antonio Serra Lanthanide Bimetallic Helicates for in Vitro Imaging and Sensing. By Jean-Claude G. Bünzli, Anne-Sophie Chauvin, Caroline D.B. Vandevyver, Song Bo, and Steve Comby Time-Gated Luminescence Microscopy. By Russell E. Connally and James	91 97 106
Luz, Cláudio Roberto Neri, and Osvaldo Antonio Serra Lanthanide Bimetallic Helicates for in Vitro Imaging and Sensing. By Jean-Claude G. Bünzli, Anne-Sophie Chauvin, Caroline D.B. Vandevyver, Song Bo, and Steve Comby	97
Luz, Cláudio Roberto Neri, and Osvaldo Antonio Serra Lanthanide Bimetallic Helicates for in Vitro Imaging and Sensing. By Jean-Claude G. Bünzli, Anne-Sophie Chauvin, Caroline D.B. Vandevyver, Song Bo, and Steve Comby Time-Gated Luminescence Microscopy. By Russell E. Connally and James A. Piper Time-resolved Microspectrofluorometry and Fluorescence Imaging Techniques: Study of Porphyrin-mediated Cellular Uptake of Oligonucleotides. By Petr Praus, Eva Kočišová, Peter Mojzeš, Josef Štěpánek, Olivier Seksek, Franck	97 106
Luz, Cláudio Roberto Neri, and Osvaldo Antonio Serra Lanthanide Bimetallic Helicates for in Vitro Imaging and Sensing. By Jean-Claude G. Bünzli, Anne-Sophie Chauvin, Caroline D.B. Vandevyver, Song Bo, and Steve Comby Time-Gated Luminescence Microscopy. By Russell E. Connally and James A. Piper Time-resolved Microspectrofluorometry and Fluorescence Imaging Techniques: Study of Porphyrin-mediated Cellular Uptake of Oligonucleotides. By Petr Praus, Eva Kočišová, Peter Mojzeš, Josef Štěpánek, Olivier Seksek, Franck Sureau, and Pierre-Yves Turpin	97 106
Luz, Cláudio Roberto Neri, and Osvaldo Antonio Serra Lanthanide Bimetallic Helicates for in Vitro Imaging and Sensing. By Jean-Claude G. Bünzli, Anne-Sophie Chauvin, Caroline D.B. Vandevyver, Song Bo, and Steve Comby Time-Gated Luminescence Microscopy. By Russell E. Connally and James A. Piper Time-resolved Microspectrofluorometry and Fluorescence Imaging Techniques: Study of Porphyrin-mediated Cellular Uptake of Oligonucleotides. By Petr Praus, Eva Kočišová, Peter Mojzeš, Josef Štěpánek, Olivier Seksek, Franck Surcau, and Pierre-Yves Turpin Part IV. Fluorescence Probes and Labels Fluorescent DNA Base Modifications and Substitutes: Multiple Fluorophore Labeling and the DETEQ Concept. By Hans-Achim Wagenknecht Fluorescent Probes for Chemical Transformations on the Single-Molecule Level. By Gregor Jung, Alexander Schmitt, Michaela Jacob, and Babette Hinkeldey	97 106 117
Luz, Cláudio Roberto Neri, and Osvaldo Antonio Serra Lanthanide Bimetallic Helicates for in Vitro Imaging and Sensing. By Jean-Claude G. Bünzli, Anne-Sophie Chauvin, Caroline D.B. Vandevyver, Song Bo, and Steve Comby Time-Gated Luminescence Microscopy. By Russell E. Connally and James A. Piper Time-resolved Microspectrofluorometry and Fluorescence Imaging Techniques: Study of Porphyrin-mediated Cellular Uptake of Oligonucleotides. By Petr Praus, Eva Kočišová, Peter Mojzeš, Josef Štěpánek, Olivier Seksek, Franck Surcau, and Pierre-Yves Turpin Part IV. Fluorescence Probes and Labels Fluorescent DNA Base Modifications and Substitutes: Multiple Fluorophore Labeling and the DETEQ Concept. By Hans-Achim Wagenknecht Fluorescent Probes for Chemical Transformations on the Single-Molecule Level.	97 106 117

Contents

Which Are You Watching, an Individual Reactive Oxygen Species or Total Oxidative Stress?. By Hatsuo Maeda	149
Probing of Cosolvents in Polymer Latex Materials by Using Solvatochromic Fluorescence. By Albert M. Brouwer, Tanzcela N. Raja, Koen Biemans, Tijs Nabuurs, and Ronald Tennebroek	157
Red/Near-infrared Boron Dipyrromethene Dyes as Strongly Emitting Fluorophores. By Ana B. Descalzo, Hai-Jun Xu, Zhen Shen, and Knut Rurack	164
Sensitive Terbium Probes for Luminescent Determination of both Alkaline Phosphatase and Codeine Phosphate. By Axel Duerkop, Darya Aleksandrova, Yuliya Scripinets, Alla Yegorova, and Ekateryna Vityukova	172
Fluorescent Probes and Labels for Biomedical Applications. <i>By</i> Leonid Patsenker, Anatoliy Tatarets, Olga Kolosova, Olena Obukhova, Yevgeniy Povrozin, Iryna Fedyunyayeva, Inna Yermolenko, and Ewald Terpetschnig	179
Part V. Fluorescence Micro- and Nanoparticles	
Photon Upconversion in Homogeneous Fluorescence-based Bioanalytical Assays. By Tero Soukka, Terhi Rantanen, and Katri Kuningas	188
Processing and Characterization of Gold Nanoparticles for Use in Plasmon Probe Spectroscopy and Microscopy of Biosystems. By Yu Chen, Jon A. Preece, and Richard E. Palmer	201
Multifunctionalized Biocompatible Microspheres for Sensing. Br Rosario M. Sánchez-Martín, Lois Alexander, and Mark Bradley	207
Fluorescent Silica Nanoparticles. Br Heike Mader, Xiaohua Li, Sayed Saleh, Martin Link, Peter Kele, and Otto S. Wolfbeis	218
Thermally Activated Delayed Fluorescence in Fullerenes. By Carlos Baleizão and Mário N. Berberan-Santos	224
Stability and Fluorescence Quantum Yield of CdSe ZnS Quantum Dots—Influence of the Thickness of the ZnS Shell. By Markus Grabolle, Jan Ziegler, Alexei Merkulov, Thomas Nann. and Utc Resch-Genger	235
Size Distributions of Cadmium Sulfide Nanoparticles Obtained from Templating Methods. Br Paulo J. G. Coutinho, Candido A. G. Mendes, and	242
Teresa S. V. Reis	247
Characterization of Water-soluble Luminescent Quantum Dots by Fluorescence Correlation Spectroscopy. Br Chaoqing Dong, Xiangyi Huang.	
and Jieun Ren Luminescent Amino-functionalized or Erbium-doped Silica Spheres for Biological Applications. Br Francesco Enrichi	253 262
Preparation and Characterization of Nanocrystalline ZrO ₂ ;Yb ³ +,Er ³ + Up-conversion Phosphors, Br Iko Hyppänen, Jorma Hölsä, Jouko Kankare, Mika Lastusaari, and Laura Pihlgren	267
Nano- and Microparticles of Organic Fluorescent Dyes: Self-organization and Optical Properties. Br Suzanne Fery-Forgues. Mouhammad Abyan, and Jean-François Lamere	272

Part VI. Biophysical Fluorescence and Bioanalytical Fluorescence

Flow Cytometric FRET Analysis of erbB Receptor Interaction on a Cell-by-Cell Basis. By Simone Diermeier-Daucher, Max Hasmann, and Gero Brockhoff	280
Toward Improved Biochips Based on Rolling Circle Amplification—Influences of the Microenvironment on the Fluorescence Properties of Labeled DNA Oligonucleotides. By Elke Mayer-Enthart, Julien Sialelli, Knut Rurack, Ute Resch-Genger, Daniela Köster, and Harald Seitz	287
Fluorescent Studies on Cooperative Binding of Cationic Pheophorbide-a Derivative to Polyphosphate. By Olga Ryazanova, Igor Voloshin, Igor Dubey, Larisa Dubey, and Victor Zozulya	293
Effect of pH on Aqueous Phenylalanine Studied Using a 265-nm Pulsed Light-emitting Diode. By Alexander M. Macmillan, Colin D. McGuinness, Kulwinder Sagoo, David McLoskey, John C. Pickup, and David J. S. Birch	300
Ordered Self-assembly of Protonated Porphyrin Induced by the Aqueous Environment of Biomimetic Systems. By Suzana M. Andrade and Silvia M. B. Costa	305
Human Serum Albumin-flavonoid Interactions Monitored by Means of Tryptophan Kinetics. By Olaf J. Rolinski, Andrew Martin, and David J. S. Birch	314
Two-photon Excitation Fluorescence Bioassays. By Pekka Hänninen, Jori Soukka, and Juhani T. Soini	320
Index of Contributors	327