
Contents

Part I

Need for Standardization of Fluorescence-Based Measurements

Quantitative Fluorescence Calibration: a Tool for Assessing the Quality of Data Obtained by Fluorescence Measurements R. F. Vogt Jr. · G. E. Marti · V. Zenger	3
--	---

Need for and Metrological Approaches Towards Standardization of Fluorescence Measurements from the View of National Metrology Institutes P. C. DeRose · L. Wang · A. K. Gaigalas · G. W. Kramer U. Resch-Genger · U. Panne	33
---	----

Part II

Steady State Fluorometry

Linking Fluorometry to Radiometry with Physical and Chemical Transfer Standards: Instrument Characterization and Traceable Fluorescence Measurements U. Resch-Genger · D. Pfeifer · K. Hoffmann · G. Flachenecker A. Hoffmann · C. Monte	65
---	----

Fluorescence Quantum Yields: Methods of Determination and Standards K. Rurack	101
---	-----

Long-Wavelength and Near-Infrared Fluorescence: State of the Art, Future Applications, and Standards J. N. Miller	147
Surface Fluorescence: the Only Standardized Method of Measuring Luminescence J. Zwinkels	163
 Part III Time Resolved Fluorometry	
Time-Resolved Fluorometry: Typical Methods, Challenges, Applications and Standards N. V. Tkachenko · H. Lemmetyinen	195
Practical Time-Resolved Fluorescence Spectroscopy: Avoiding Artifacts and Using Lifetime Standards N. Boens · M. Ameloot · B. Valeur	215
Evaluation of Time-Resolved Fluorescence Data: Typical Methods and Problems M. Patting	233
Time-Resolved Fluorescence: Novel Technical Solutions U. Ortmann · M. Wahl · P. Kapusta	259
 Part IV Fluorescence Polarization Techniques: Applications in the Material and the Life Sciences	
Fluorescence Depolarization Techniques in Materials Science D. J. S. Birch · J. Karolin	279
Fluorescence Polarization: Recent Bioanalytical Applications, Pitfalls, and Future Trends A. A. Goulko · Q. Zhao · J. W. Guthrie · H. Zou · X. C. Le	303

Part V

**Fluorescent Chemical Sensors:
Principles, Problems, and Need for Quality Assurance**

**Classification of Chemical Sensors and Biosensors
Based on Fluorescence and Phosphorescence**
S. Nagl · O. S. Wolfbeis 325

**Fibre-Optic and Nanoparticle-Based Fluorescence Sensing
Using Indicator Dyes: Pitfalls, Self- Referencing, Application,
and Future Trends**
G. J. Mohr 347

**Intrinsically Referenced Fluorimetric Sensing
and Detection Schemes: Methods, Advantages
and Applications**
M. Schäferling · A. Duerkop 373

**Total Internal Reflection Fluorescence Sensing –
Quality Assurance and Application to Water Analysis**
G. Gauglitz · G. Proll 415

**Fluorescence Sensing and Imaging
Using Pressure-Sensitive Paints
and Temperature-Sensitive Paints**
M. I. J. Stich O. S. Wolfbeis · 429

Part VI

Fluorescence Analysis of Actinides

**Luminescence Analysis of Actinides:
Instrumentation, Applications, Quantification,
Future Trends, and Quality Assurance**
I. Billard · G. Geipel 465

Subject Index 493