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Nota di contenuto	Handbook of Fluorescence Spectroscopy and Imaging: From Single Molecules to Ensembles; Contents; Preface; 1 Basic Principles of Fluorescence Spectroscopy; 1.1 Absorption and Emission of Light; 1.2 Spectroscopic Transition Strengths; 1.3 Lambert-Beer Law and Absorption Spectroscopy; 1.4 Fluorophore Dimerization and Isosbestic Points; 1.5 Franck-Condon Principle; 1.6 Temperature Effects on Absorption and Emission Spectra; 1.7 Fluorescence and Competing Processes; 1.8 Stokes Shift, Solvent Relaxation, and Solvatochroism; 1.9 Fluorescence Quantum Yield and Lifetime; 1.10 Fluorescence Anisotropy References2 Fluorophores and Fluorescent Labels; 2.1 Natural Fluorophores; 2.2 Organic Fluorophores; 2.3 Different Fluorophore Classes; 2.4 Multichromophoric Labels; 2.5 Nanocrystals; References; 3 Fluorophore Labeling for Single-Molecule Fluorescence Spectroscopy (SMFS); 3.1 In Vitro Fluorescence Labeling; 3.2 Fluorescence Labeling in Living Cells; References; 4 Fluorophore Selection for Single-Molecule

Fluorescence Spectroscopy (SMFS) and Photobleaching Pathways; References; 5 Fluorescence Correlation Spectroscopy; 5.1 Introduction; 5.2 Optical Set-Up; 5.3 Data Acquisition and Evaluation
5.4 Milliseconds to Seconds: Diffusion and Concentration5.4.1 Single-Focus FCS; 5.4.2 Dual-Focus FCS; 5.5 Nanoseconds to Microseconds: Photophysics, Conformational Fluctuations, Binding Dynamics; 5.6 Picoseconds to Nanoseconds: Rotational Diffusion and Fluorescence Antibunching; 5.6.1 Antibunching; 5.6.2 Rotational Diffusion; 5.7 Fluorescence Lifetime Correlation Spectroscopy; 5.8 Conclusion; References; 6 Excited State Energy Transfer; 6.1 Introduction; 6.2 Theory of (F€orster) Energy Transfer; 6.2.1 Mechanism and Mathematical Formalism of FRET
6.2.2 Measuring FRET Efficiencies Through Excited-State Lifetimes6.2.3 Spin Rules for FRET; 6.2.4 Homo-FRET and FRET-Induced Depolarization; 6.3 Experimental Approach for Single-Pair FRET-Experiments; 6.3.1 Single-Laser Excitation; 6.3.2 Alternating-Laser Excitation (ALEX); 6.4 Examples and Applications of FRET; 6.4.1 FRET Processes in Bulk Experiments; 6.4.1.1 FRET-Based Molecular Biosensors; 6.4.1.2 Energy Hopping and Trapping in Chromophore-Substituted Polyphenylene Dendrimers; 6.4.2 Single-Molecule Observation of FRET; 6.4.2.1 Light-Harvesting Systems: Phycobilisomes and Allophycocyanins
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8.2 Multi-Photon and Structured Illumination Microscopy

Sommario/riassunto

Providing much-needed information on fluorescence spectroscopy and microscopy, this ready reference covers detection techniques, data registration, and the use of spectroscopic tools, as well as new techniques for improving the resolution of optical microscopy below the resolution gap. Starting with the basic principles, the book goes on to treat fluorophores and labeling, single-molecule fluorescence spectroscopy and enzymatics, as well as excited state energy transfer, and super-resolution fluorescence imaging.Examples show how each technique can help in obtaining detailed and refine