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3.5 Modes of Operation of LC-MS-NMR3.5.1 On-Flow Mode; 3.5.2 Stop-Flow Mode; 3.6 Other Modes of Operation; 3.7 Challenging Considerations; 3.7.1 Air Bubbles; 3.7.2 Carryover with and Without an Autosampler; 3.7.3 Sample Solubility and Precipitation; 3.7.4 Flow Cell and System Cleaning; 3.7.5 Flow Rate and Magnetic Susceptibility; 3.7.6 Quantitation; 3.8 Conclusions; References; 4. Applications of LC-NMR; 4.1 Introduction; 4.2 Applications of LC-NMR; 4.2.1 Natural Products; 4.2.2 Drug Metabolism; 4.2.3 Drug Discovery; 4.2.4 Impurity Characterization; 4.2.5 Degradation Products
4.2.6 Food Analysis4.2.7 Polymers; 4.2.8 Metabolomics and Metabonomics; 4.2.9 Isomers, Tautomers, and Chiral Compounds; 4.2.10 Others Areas; 4.3 Conclusions and Future Trends; References; 5. Applications of LC-MS-NMR; 5.1 Introduction; 5.2 Applications of LC-MS-NMR; 5.2.1 Natural Products; 5.2.2 Drug Metabolism; 5.2.3 Drug Discovery and Development; 5.2.4 Metabolomics and Metabonomics; 5.2.5 Others Areas; 5.3 Conclusions and Future Trends; References; 6. Hyphenation of NMR with Other Analytical Separation Techniques; 6.1 Introduction; 6.2 GC-NMR; 6.3 GPC-NMR; 6.4 SEC-NMR; 6.5 SFC-NMR 6.6 SFE-NMR6.7 CE-NMR; 6.8 CEC-NMR; 6.9 CZE-NMR; 6.10 cITP-NMR; 6.11 CapLC-NMR; 6.12 SPE-NMR; 6.13 SPE-MS-NMR; 6.14 Conclusions and Future Trends; References; 7. Special Topics and Applications Related to LC-NMR; 7.1 Introduction; 7.2 Off-Line Versus Online NMR for Structural Elucidation; 7.2.1 Cases Solved Off-Line; 7.2.2 Cases Solved Online; 7.3 Analysis of Chiral Molecules by NMR; 7.3.1 Classical Approach: Off-Line; 7.3.2 Nonclassical Approach: Online; 7.4 Monitoring Chemical Reactions In Situ; 7.4.1 Classical Approach: Off-Line; 7.4.2 Nonclassical Approach: Online
7.5 Analysis of Mixtures Off-Line, Online, and by Other NMR Methodologies

Sommario/riassunto

This practical guide provides a basic overview of the pros and cons of NMR spectroscopy as both a hyphenated and non-hyphenated technique. The book begins with a description of basic NMR concepts for the structural elucidation of organic compounds and then details the historical development of NMR and hyphenated NMR in the structural elucidation world, followed by applications of hyphenated NMR as LC-NMR and LC-MS-NMR in industry and academia. It also contains updated information on the latest advancements and applications of LC-NMR in such areas as degradation products, drug metabolism, food