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3.3.2 Hydrogen Bonding
3.3.3 Alternative Background Removal Strategies; 3.3.4 Automatic Region Selection for CLS Methods; 3.4 Future Applications; References; 4 Emerging Infrared Laser Absorption Spectroscopic Techniques for Gas Analysis; 4.1 Introduction; 4.2 Laser Absorption Spectroscopic Techniques; 4.2.1 Quantum and Interband Cascade Lasers; 4.2.2 Cavity-Enhanced Spectroscopy: CRDS and ICOS; 4.2.3 Conventional and Quartz-Enhanced Photoacoustic Spectroscopy; 4.2.4 Cavity-Enhanced Direct Frequency-Comb Spectroscopy; 4.3 Applications of Semiconductor LAS-Based Trace Gas Sensor Systems
4.3.1 OA-ICOS Online Measurement of Acetylene in an Industrial Hydrogenation Reactor
4.3.2 Multicomponent Impurity Analysis in Hydrogen Process Gas Using a Compact QEPAS Sensor; 4.3.3 Analysis of Trace Impurities in Arsine by CE-DFCS at 1.75 to 1.95 mm; 4.4 Conclusions and Future Trends; References; 5 Atmospheric Pressure Ionization Mass Spectrometry for Bulk and Electronic Gas Analysis; 5.1 Introduction; 5.2 APIMS Operating Principle; 5.3 Point-to-Plane Corona Discharge Ionization; 5.4 Factors Affecting Sensitivity in Point-to-Plane Corona Discharge APIMS; 5.4.1 Effects of Pressure
5.4.2 Effects of Declustering Lens Voltage
5.4.3 Effects of Coexisting Analytes; 5.4.4 Isotopic Dilution APIMS Measurements; 5.5 Applications of Point-to-Plane Corona Discharge APIMS; 5.5.1 Bulk Gas Analysis; 5.5.2 Electronic Specialty Gas Analysis; 5.6 Nickel-63 Beta Emitter APIMS; 5.6.1 Nickel-63 Source Design; 5.6.2 Ion Formation from a Nickel-63 Source; 5.6.3 Importance of the Declustering Region for Nickel-63 Sources; 5.6.4 Overcoming Competing Positive-Ion Proton Affinities; 5.6.5 Negative-Ion Cluster Formation
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Sommario/riassunto

Explores the latest advances and applications of specialty and electronic gas analysis. The semiconductor industry depends upon a broad range of instrumental techniques in order to detect and analyze impurities that may be present in specialty and electronic gases, including permanent gases, water vapor, reaction by-products, and metal species. Trace Analysis of Specialty and Electronic Gases draws together all the latest advances in analytical chemistry, providing researchers with both the theory and the operating principles of the full spectrum of instrumental technique

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Sommario/riassunto	This eBook is a collection of articles from a Frontiers Research Topic. Frontiers Research Topics are very popular trademarks of the Frontiers Journals Series: they are collections of at least ten articles, all centered on a particular subject. With their unique mix of varied contributions from Original Research to Review Articles, Frontiers Research Topics unify the most influential researchers, the latest key findings and historical advances in a hot research area! Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers Editorial Office: frontiersin.org/about/contact