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2.2 General Dynamic Equation; 2.2.1 Discrete Particle Size Distribution; 2.2.2 Continuous Particle Size Distribution; 2.3 Nucleation: New Particle Formation; 2.3.1 Classical Nucleation Theory; 2.3.2 Multicomponent Nucleation; 2.3.3 Heterogeneous Nucleation; 2.3.4 Atmospheric Nucleation; 2.4 Growth by Condensation
2.5 Coagulation and Agglomeration2.5.1 Brownian Coagulation; 2.5.2 Agglomeration; 2.6 Deposition Mechanisms; 2.6.1 Stokes Law; 2.6.2 Gravitational Settling; 2.6.3 Deposition by Diffusion; 2.6.4 Deposition by Impaction; 2.6.5 Phoretic Effects; 2.6.6 Atmospheric Aerosol Deposition; 2.6.7 Deposition in the Human Respiratory Tract; 2.7 Resuspension; 2.7.1 Monolayer Resuspension; 2.7.2 Multilayer Resuspension; References; Chapter 3 Recommendations for Aerosol Sampling; 3.1 Introduction; 3.2 Guidelines for Standardized Aerosol Sampling; 3.2.1 General Recommendations
3.2.2 Standardization of Aerosol Inlets3.2.2.1 Size Cut-Offs; 3.2.2.2 Whole-Air Inlet for Extreme Ambient Conditions; 3.2.2.3 Tubing and Flow Splitters; 3.2.3 Humidity Control; 3.2.3.1 Ambient Dew-Point Temperature; 3.2.3.2 Drying Technology; 3.3 Concrete Sampling Configurations; 3.3.1 General Aspects of Particle Motion; 3.3.2 Laminar Flow Sampling Configuration; 3.3.2.1 Examples of Sampling Configurations with a Laminar Flow; 3.3.3 Turbulent Flow Sampling Configuration; 3.3.3.1 Example of a Sampling Configuration with a Turbulent Flow; 3.4 Artifact-Free Sampling for Organic Carbon Analysis AcknowledgementsReferences; Chapter 4 Aerosol Instrumentation; 4.1 Introduction; 4.2 General Strategy; 4.3 Aerosol Sampling Inlets and Transport; 4.4 Integral Moment Measurement; 4.4.1 Total Number Concentration Measurement: Condensation Particle Counter (CPC); 4.4.2 Total Mass Concentration Measurement: Quartz-Crystal Microbalance (QCM) and Tapered-Element Oscillating Microbalance (TEOM); 4.4.3 Light-Scattering Photometers and Nephelometers; 4.5 Particle Surface Area Measurement; 4.6 Size-Distribution Measurement; 4.6.1 Techniques based on Particle--Light Interaction
4.6.1.1 Optical Particle Counter (OPC)4.6.2 Techniques based on Particle Inertia; 4.6.2.1 Particle Relaxation-Size Analyzers; 4.6.2.2 Cascade Impactors; 4.6.3 Techniques based on Particle Electrical Mobility; 4.6.3.1 Electrical Aerosol Analyzers (EAAs); 4.6.3.2 Differential Mobility Analyzers (DMAs) and Fast-Mobility Particle Sizers; 4.6.3.3 Aerosol Particle Mass (APM) Analyzer and Couette Centrifugal Particle Mass Analyzer (Couette CPMA); 4.6.4 Techniques based on Particle Diffusion; 4.6.4.1 Diffusion Batteries; 4.7 Chemical Composition Measurement; 4.8 Conclusion; References
Chapter 5 Filtration Mechanisms

Sommario/riassunto

Aerosols influence many areas of our daily life. They are at the core ofenvironmental problems such as global warming, photochemical smog andpoor air quality. They can also have diverse effects on human health, whereexposure occurs in both outdoor and indoor environments. However, aerosols can have beneficial effects too; the delivery of drugs to thelungs, the delivery of fuels for combustion and the production of nanomaterialsall rely on aerosols. Advances in particle measurement technologies havemade it possible to take advantage of rapid changes