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Titolo	Fundamental Aspects of Plasma Chemical Physics : Kinetics / / by Mario Capitelli, Roberto Celiberto, Gianpiero Colonna, Fabrizio Esposito, Claudine Gorse, Khaled Hassouni, Annarita Laricchiuta, Savino Longo
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Disciplina	530
Soggetti	Plasma (Ionized gases) Physical chemistry Mathematical physics Mechanics Plasma Physics Physical Chemistry Theoretical, Mathematical and Computational Physics Classical Mechanics
Lingua di pubblicazione	Inglese
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Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Electron-molecule cross sections and rates involving rotationally, vibrationally and electronically excited states -- Reactivity and relaxation of vibrationally/rotationally excited molecules with open shell atoms -- Formation of vibrationally and rotationally excited molecules during atom recombination on surfaces -- Collisional-radiative models for atomic plasmas -- Collisional-radiative models for molecular plasmas -- Kinetic and Monte Carlo approaches to solve Boltzmann equation for the electron energy distribution functions -- Non-equilibrium plasma kinetics under discharge and post-discharge conditions: coupling problems for low pressure and atmospheric cold plasmas -- Ion transport under strong fields -- PIC (Particle In Cell) models for low-pressure plasmas -- Negative ion H- for fusion -- Non equilibrium plasma expansion through nozzles.

Sommario/riassunto

Describing non-equilibrium "cold" plasmas through a chemical physics approach, this book uses the state-to-state plasma kinetics, which considers each internal state as a new species with its own cross sections. Extended atomic and molecular master equations are coupled with Boltzmann and Monte Carlo methods to solve the electron energy distribution function. Selected examples in different applied fields, such as microelectronics, fusion, and aerospace, are presented and discussed including the self-consistent kinetics in RF parallel plate reactors, the optimization of negative ion sources and the expansion of high enthalpy flows through nozzles of different geometries. The book will cover the main aspects of the state-to-state kinetic approach for the description of nonequilibrium cold plasmas, illustrating the more recent achievements in the development of kinetic models including the self-consistent coupling of master equations and Boltzmann equation for electron dynamics. To give a complete portrayal, the book will assess fundamental concepts and theoretical formulations, based on a unified methodological approach, and explore the insight in related scientific problems still opened for the research community.