Preface

The first edition of the book on Low-Temperature Plasma, published in 2000, has been well received by physicists, scientists, and engineers dealing with plasma physics and plasma physical applications, particularly plasma processing. This positive response of practicing plasma scientists and engineers to this book, as well as the rapid development in the area of low-temperature plasma applications, has encouraged the publishing house and the editors to publish a second edition.

In the area of low-temperature plasma physics, the last decade may be characterized by progress in the development of plasma sources, new types of excitation, and the rise in interest (again) in plasmas at atmospheric pressure with their various new applications. Dusty plasmas became a recognized field of plasma research and not merely a concern for contamination in semiconductor chip production. Plasma processing on an industrial scale is now well established and considered as a key technology, cutting across disciplines. The progress in the developments of plasma sources and applications is accompanied by advances of the kinetic theory and improvements in diagnostics, especially related to optical spectroscopy.

These developments have led to a critical review and, where necessary, additions to chapters which were included in the first edition. The progress in the area of low-temperature plasma physics, in plasma sources, novel plasma scientific applications, and improvements in diagnostics has been taken into account by introducing a series of new chapters, written by distinguished plasma scientists from Europe, the United States, and Asia. These new contributions are related to dusty plasmas and its applications, and to new diagnostic methods. Atmospheric pressure plasmas, with emphasis on microdischarges, and their applications have been covered in several chapters. One of those is the emerging field of medical applications using atmospheric pressure plasmas, including cold-plasma-based sterilization. Additional chapters relate to transient plasma ignition, EUV light sources, magnetron-, hollow-cathode-discharges, plasma-assisted surface modification of biointerfaces, and plasma jets for thin film deposition.

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