

Preface

Each scientist works with certain information and collects it in the course of professional activity. In the same manner, the author collected data for atomic physics and atomic processes. This information was checked in the course of the author's professional activity and was published in the form of appendices to the corresponding books on atomic and plasma physics. Now it has been decided to publish these data separately.

This book contains atomic data and useful information about atomic particles and atomic systems including molecules, nanoclusters, metals and condensed systems of elements. It also gives information about atomic processes and transport processes in gases and plasmas. In addition, the book deals with general concepts and simple models for these objects and processes. We give units and conversion factors for them as well as conversion factors for spread formulas of general physics and the physics of atoms, clusters and ionized gases since such formulas are used in professional practice by each scientist of this area.

This book includes numerical information from some reference books for physical units and constants [1–4] and for numerical parameters of atomic particles and processes [2, 5–10] (in the most degree [2]). We also use data of some reviews and original papers. The methodical peculiarity of this book consists in representation of some physical parameters in the form of periodic tables. This form simplifies the information retrieval because it only uses uniform information. If the data relate to a restricted number of elements, they are given in the form of specified tables.

Some part of the book is devoted to atomic spectra, which are given in the form of the Grotrian diagrams for atoms with the electron valence shell s , s^2 , and also the valence shell p^k for light atoms. This information has not changed during the last decades. We use the Grotrian diagrams from [11]; diagrams for the lowest atom states are taken from [12]. Along with the Grotrian diagrams, some concepts and formulas of atomic physics are represented.

This book also contains basic concepts of the physics of atomic systems and the simplest models for their description. These models may be a basis for simple estimations of the parameters of some atomic objects and processes. For example, the model of a hard sphere describes atom–cluster collisions, the liquid drop model is convenient for the analysis of cluster evaporation and other cluster processes and the model of a degenerate electron gas may be used for the metal plasma. In these

cases numerical parameters of models are given for certain objects, as they follow from measured object parameters.

As a scientist who has used the data about atomic and plasma physics contained herein to fulfill some estimations for certain problems of this area, the author intends this book to be used by scientists and advanced students. In the first stage of information collection, the author was a user of these data, and the basis of this book is Appendices to books [12–16] for certain aspects of atomic and plasma physics. Therefore the author hopes that this book will be useful both for specialists and for advanced students of this physical area.

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Boris M. Smirnov

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Smirnov, B.M.

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