
BOOK REVIEWS

Thermodynamics and Statistical Physics by S. L. Kakani, (Published by Sultan Chand & Sons, 23, Daryaganj, New Delhi 110 002), 1987, pp. 362. Price: Rs.30/-

This book is a useful text for undergraduates and first year post-graduate students in physical chemistry of Indian Universities. The author has explained fairly well the basic principles and fundamental concepts of thermodynamics and their applications to the kinetic theory of gases, liquefaction of gases and production of low temperatures, statistical mechanics, quantum theory of radiation and specific heats of solids and gases and thermal conduction. The book has been written although not in good English, in a simple language, so that an average science student of an Indian University can easily follow.

The author has taken considerable pain to collect the material exhaustively, but the subject matter needs rearrangement and revision with minor modifications in the titles of the chapters in order to maintain continuity in the subject. The suggested rearrangement of the main chapters and subchapters in a given chapter along with minor modifications in the titles of the main chapters are as follows:

Chapter 1. Zeroth and first law of thermodynamics; 2. Second and third laws of Thermodynamics; 3. Thermodynamic relations; 4. Kinetic theory of gases; 5. Liquefaction of gases and production of low temperatures; 6. Statistical mechanics; 7. Quantum theory of radiation; 8. Quantum theory of specific heats of solids and gases; 9. Thermal conduction.

A knowledge of the kinetic theory of gases is essential to understand the principles of liquefaction of gases and production of low temperatures. Therefore, the former must appear earlier to the latter. Since the mechanics of particles is involved, it appears reasonable to use the title Statistical Mechanics instead of Statistical Physics. Moreover, Statistical Mechanics is the most commonly used name in modern texts. In view of this, it is better to change the title of the book also to Thermodynamics and Statistical Mechanics.

The subchapters 21, 22 and 23 in the main chapter on kinetic theory of gases may be shifted and introduced after the subchapter 10 of the main chapter on Statistical Mechanics. This is very necessary because Maxwell's distribution law of

velocities and its experimental verification, and average, rms and most probable velocities are the outcome of Maxwell-Boltzmann distribution law in general. Moreover, the subchapter 11 in the main chapter on Statistical Mechanics has to appear after the subchapter 4 in the same main chapter. This rearrangement is essential because the characteristics of M-B, B-E and F-D statistics should be discussed earlier to the treatment on Thermodynamic probability. Next, the subchapters 19 and 20 in the main chapter on Kinetic theory of gases has to be shifted to suitable positions in the main chapter on Thermal conduction, preferably to the "Introduction" part of same chapter. This will ensure continuity and smooth running of the subject matter. It is emphasized here that this rearrangement of the subchapters must be done with suitable modification or revision of the subject matter in the text, and must not be transferred mechanically.

The book in 9 chapters has some special features. A large number of solved problems, questions and problems asked in the various University examinations have been given at the end of each chapter so that the students can clearly understand the various principles and concepts discussed in the chapter. A brief summary of each chapter has been given to help the students to grasp the subject better. A large number of objective type, short answer, true/false type and fill in the blanks type questions with answers have also been given at the end of each chapter. An appendix at the end of each chapter contains the derivation of important equations. Suggested reading references are also provided at the end of the book.

These special features will serve the students more as a guide rather than as a original text. However, this book will serve as a useful text provided it is revised as per the above suggestions.

M.P.VENKATAPPA

Department of Chemistry,
Central College,
Bangalore University,
Bangalore 560 001.

Saline Environment and Plant Growth by S. K. Sharma and I. C. Gupta (Published by Agro-Botanical Publishers (India), Old Ginnani, Bikaner 334 001), 1986, pp. 172. Price Rs.150/-.

Increasing agricultural production to satisfy the growing needs of expanding population is achieved through extension of irrigation to arid lands of low productivity, exploitation of marginal lands, reclaimed lands from sea, and using waters once considered unsuitable for irrigation. Irrigation systems have generated saline lands which have gone out of cultivation. With increasing limitations in quality land and water, greater scientific effort and management skills are needed to restore productivity. It is in this context that compilation of research data on managing saline soils for greater productivity has been brought about in this book.

The extent of land that has become salinized in India and the physical, chemical, biological and mineralogical properties of such lands along with the historical review on the survey of saline soils have been discussed. Aspects of management of saline soils such as drainage, chemical amendments and cultural practices including selection of suitable cultivars and cropping patterns are elaborated.

Classification of plants in relation to their tolerance to salt concentration and water relations of plants in a saline environment have been given. Uptake of cations and anions leading to ionic imbalances and osmotic effects adversely affecting plant growth have been critically discussed. Metabolic processes under saline and non-saline conditions have been compared. The mechanisms by which the plants growing in a saline environment adjust themselves to produce dry matter and exclude the effects of the environment have been reviewed.

Apart from resorting to reclamation of saline soil and improving the plant output by cultural and management methods, possibilities and necessity for research efforts on improving plant genotypes for maximum economic production in a saline environment have been stressed.

Although sincere efforts have been made in bringing all the research information on saline-agriculture, there are a few lacunae which could have been avoided to improve the quality of publication. These are: 1. List of abbreviations and definition of terms used in the text should have been given, 2. The book is mainly concerned with saline environment and yet effects of alkali or sodicity, and the effect of Na_2CO_3 and NaHCO_3 are frequently compared with effects of salinity. Title, objectives and contents of the book therefore need to be revised. 3. Errors in expression, citation of authors and year, formula (proline) and poor proof reading are some drawbacks in the book. 4. Organization of materials in mentioning chapter numbers, sub-divisions of ideas (paras) with proper types could have been improved. 5. A few figures and photographs are of poor quality in the display of the legend and treatment effects.

It is hoped that in the next publication these shortcomings are rectified.

The publication would serve as a source material for agricultural scientists.

P. B. DESHPANDE

Professor of Chemistry
and Soils (Retd.),
141, UAS Lay-out,
Nagashettyhalli,
Bangalore 560 024.