

# Preface



Engineering and technology have become inter-disciplinary with chemical, physical and biological sciences contributing immensely to the development of engineering practices. Applied chemistry is a fascinating area with profound implications for engineers as well as biologists. Materials fabricated and used in our daily life are obviously derived from chemicals, both natural and synthetic and their range of utility are growing day by day. It is imperative that engineers of different disciplines acquire sufficient knowledge of the materials and their characteristics for making proper selection of their end use applications. The use of tailor made materials of specific end uses have almost become the order of day. Fine tuning the properties of materials through the development of necessary chemical processes are in the realm of practicing chemists but it is the job of practicing engineers to define the basic requirements of specific end uses and to evaluate the finished products for stated purposes. Hence, a basic understanding of the chemistry of materials and processes is a must for an engineer or a technologist. A proper perspective of applied chemistry requires a sound knowledge of the underlying principles. The present book envisages at providing the necessary introduction of the chemical principles involved and applications of various materials and devices in a comprehensive manner yet understandable to the students aspiring to become practicing engineers.

## Objective

The book has been prepared to cater to the needs of engineering students with sufficient background of chemistry acquired at the Senior Secondary level. The objective is to present the necessary theoretical aspects required for understanding intricacies of the subject and also give sufficient exposure to the applied chemistry aspects in different disciplines of engineering. Universities in India have prescribed syllabi with varying emphasis on diverse topics of interest to engineers. The depth of coverage of each topic varies, with some syllabi oriented towards applied aspects, while others stressing more on characterisation, particularly with instruments. The present book has been prepared taking into account the requirements of engineering students of different Universities, giving an in-depth coverage of a wide range of topics and hence will be useful for engineering & technology students and also to teachers in preparing for their lectures.

## Organisation

The presentation as well as treatment of topics are user friendly and would make the reader comfortable while going through the book. The first few chapters deal more with the fundamental aspects such as thermodynamics, chemical kinetics, solid state, electrochemistry and phase equilibria as well as applications of relevance. Two chapters have been presented exclusively on analytical chemistry involving the classical and instrumental methods to make engineers feel at ease and also give them an insight with regard to the use of different methods by chemists for characterising materials. The last few chapters deal with application oriented topics of relevance to engineers and technologists.

## Features

This book on Engineering Chemistry is written with the intention of discussing the required topics at the right level keeping in mind the practical applications of the subject in the field of engineering. It offers an exhaustive coverage of the topics (especially the applications) and lucid explanation of concepts as per the present day needs and practices.

- The book follows an application based approach. There is a perfect link between theoretical aspects and relevant applications.
- Theory and fundamental aspects are discussed in the first 6 chapters followed by application oriented topics with appropriate theory in the later chapters. Coherent organisation of the main topics followed by a logical progression of subtopics make the subject easy to understand.
- A methodical approach has been followed while dealing with the conceptual and theoretical aspects of all topics.
- For more clarity, tables and figures are interspersed throughout the book.
- To enhance comprehension, solved examples have been included in many chapters.
- Review questions enable recall of concepts explained in each chapter.
- Important topics such as Photochemistry in Natural Systems and Industries (Chapter 6), Pollutions of Environment (Chapter 15), Engineering Materials (Chapter 12) and Instrumental Methods of Analysis (Chapter 10) have been dealt with appropriately.

Hence, this book proves to be a very good reference for updating knowledge and creating awareness of recent techniques and processes.

## Dedicated Web Support

Readers are encouraged to login at our website <http://www.mhhe.com/sivasankar/ec> which contains a wealth of digital content. Instructors can access Solutions Manual and PowerPoint slides, which can be used as teaching aids. Students can refer web links for in-depth research, and additional problems for practice. The website also features model question papers with solutions—an effective guide for exam preparations.

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Suggestions towards improving the text for removing any mistakes and shortcomings are most welcome and would be gratefully acknowledged.