A SHORT COURSE ON GROUP THEORY AND CHEMICAL APPLICATIONS

Hikmat S. Hilal Abed Al-Hafez Sayda

Faculty of Sciences, An-Najah N. University,
Nablus, West Bank, Palestine

Preface

Bonding theory and molecular spectroscopy imposed themselves among molecular sciences. Both subjects heavily rely on quantum mechanics and group theory, which in turn rigorously involve mathematics. However, quantum mechanics and group theory have different approaches. While the former focuses on detailed calculations of energy levels, the latter (subject matter of this book) furnishes a more qualitative approach.

Group theory is conventionally taught in a one-semester course at the senior/graduate level for science students. For such a purpose, many textbooks, dealing with rigors of derivations and theorems, have been written to give in-depth treatment. For one reason or another, scientists with no prior knowledge of group theory may need quick familiarity with the subject, without mathematical derivation rigors.

This book has been written for this purpose. The book is based on lecture notes given to senior/graduate students, who need to deal with bonding theories and spectroscopy,

without having any background in group theory. Therefore, a short 10-15 lecture-course based on this book is sufficient to give basic skills necessary to understand basics of the subjects. Alternatively, the book will serve as a self-reading guide to gain basic skills in the field. Readers who demand more advanced knowledge may also use the book as a back-bone and consult other more advanced books in parallel.

Basic knowledge of bonding theory and mathematics at the sophomore level would be sufficient. Familiarity with matrix multiplication is welcome but not necessary, as one Appendix has been devoted to matrix multiplication algebra. It is advisable to read the material in the same ordering, as each chapter depends on its preceding ones.

While introducing this book to our readers, we appreciate sending to us their comments, criticisms and suggestions which will all be highly valued.

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Hikmat S. Hilal **Abed Al-Hafez Sayda**

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