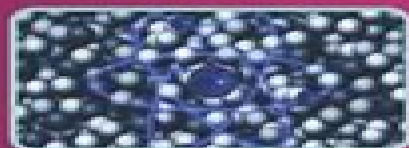


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spectroscopy as well as chemical reactions following orbital symmetry rules Exercises and examples compile and deepen the content in a lucid manner

Fundamentals of Molecular Symmetry P.R. Bunker, 2018-10-03 Winner of a 2005 CHOICE Outstanding Academic Book Award Molecular symmetry is an easily applied tool for understanding and predicting many of the properties of molecules Traditionally students are taught this subject using point groups derived from the equilibrium geometry of the molecule Fundamentals of Molecular Symmetry shows how to set up symmetry groups for molecules using the more general idea of energy invariance It is no more difficult than using molecular geometry and one obtains molecular symmetry groups The book provides an introductory description of molecular spectroscopy and quantum mechanics as the foundation for understanding how molecular symmetry is defined and used The approach taken gives a balanced account of using both point groups and molecular symmetry groups Usually the point group is only useful for isolated nonrotating molecules executing small amplitude vibrations with no tunneling in isolated electronic states However for the chemical physicist or physical chemist who wishes to go beyond these limitations the molecular symmetry group is almost always required

Symmetry in Bonding and Spectra Bodie E. Douglas, Charles A. Hollingsworth, 2012-12-02 Many courses dealing with the material in this text are called Applications of Group Theory Emphasizing the central role and primary importance of symmetry in the applications Symmetry in Bonding and Spectra enables students to handle applications particularly applications to chemical bonding and spectroscopy It contains the essential background in vectors and matrices for the applications along with concise reviews of simple molecular orbital theory ligand field theory and treatments of molecular shapes as well as some quantum mechanics Solved examples in the text illustrate theory and applications or introduce special points Extensive problem sets cover the important methods and applications with the answers in the appendix

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Motion, Symmetry & Spectroscopy of Chiral Nanostructures Johannes Sachs, 2020

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Scientific Analysis of Cultural Heritage Objects Michael Wiescher, Khachatur Manukyan, 2022-05-31 The characterization of cultural heritage objects becomes increasingly important for conservation restoration dating and authentication purposes The use of scientific methods in archaeometry and conservation science has led to a significant broadening of the field Scientific analysis of these objects is a challenging task due to their complex composition artistic and historical values requiring the use of minimally invasive and nondestructive analytical procedures This textbook summarizes scientific methods that are currently used to characterize objects of cultural heritage and archaeological artifacts This book provides a brief description of the structure of matter at the molecular atomic and nuclear levels Furthermore it discusses the chemical and physical nature of materials from the molecular to the atomic and nuclear level as determined by the principles of quantum mechanics Important aspects of natural and anthropogenic radioactivity that play a critical role for some of the analytical techniques are also emphasized The textbook also provides principles and applications of spectroscopic methods for characterization of cultural heritage objects It describes the technologies with specific examples for utilization of spectroscopic techniques in the characterization of paintings books coins ceramics and other objects Analytical approaches that employ isotopes and determination of isotope ratios will be reviewed General principles of imaging techniques and specific examples for utilization of these methods will also be summarized In the later part of the book a number of scientific techniques for the age determination of cultural heritage material and archaeological artifacts will be presented and discussed with specific examples

Molecular Symmetry and Group Theory Alan Vincent, 2013-06-05 This substantially revised and expanded new edition of the bestselling textbook addresses the difficulties that can arise with the mathematics that underpins the study of symmetry and acknowledges that group theory can be a complex concept for students to grasp Written in a clear concise manner the author introduces a series of programmes that help students learn at their own pace and enable them to understand the subject fully

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Molecular Physics W. Demtröder, 2005-12-02. The richly illustrated book comprehensively explains the important principles of diatomic and polyatomic molecules and their spectra in two separate distinct parts. The first part concentrates on the theoretical aspects of molecular physics such as the vibration, rotation, electronic states, potential curves and spectra of molecules. The different methods of approximation for the calculation of electronic wave functions and their energy are also covered. The introduction of basic terms used in group theory and their meaning in molecular physics enables an elegant description of polyatomic molecules and their symmetries. Molecular spectra and the dynamic processes involved in their excited states are given their own chapter. The theoretical part then concludes with a discussion of the field of Van der Waals molecules and clusters. The second part is devoted entirely to experimental techniques such as laser, Fourier NMR and ESR spectroscopies used in the fields of physics, chemistry, biology and material science. Time resolved measurements and the influence of chemical reactions by coherent controls are also treated. A list of general textbooks and specialized literature is provided for further reading. With specific examples, definitions and notes integrated within the text to aid understanding, this is suitable for undergraduates and graduates in physics and chemistry with a knowledge of atomic physics and familiar with the basics of quantum mechanics.

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