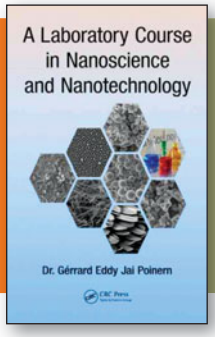
superconductors. Correlations between the crystal structures and the superconductivity of different types of superconductors are explained well with their crystal structure models. Commercialization of the first superconducting wires and their applications are also demonstrated. Theories such as London's, BCS, and the Ginzburg–Landau theory are briefly reviewed in chapter 5. Possible superconducting materials for magnetic applications are given in chapter 6. Processes to make superconducting wires for commercial applications are illustrated with clear phase diagrams. Chapter 7 discusses do-it-yourself superconducting magnets.Superconducting magnets for accelerators and their historic developments (e.g., Tevatron, HERA) are given in chapter 8. A photograph taken at CERN gives the reader a feeling of what the superconducting accelerator looks like. Images and pictorial representations along with basic concepts are given for different types of superconducting magnets in cyclotrons. Chapter 9 is about utilization of superconducting magnets in fusion reactors. Fusion mechanisms and machines based on tokamak concepts (e.g., T-7, Tore Supra) are discussed. Futuristic machines (W7-X and IGNITOR) and their functionalities and designs are also discussed with illustrations. In chapter 10, applications of magnetic materials in medical and other fields are described.

The references are adequate and up to date. This book can be useful for master's level students, and to some extent for bachelor's level students as a reference for the fundamentals of superconductivity, applications, and designs of superconducting. I strongly recommend this book to all scientists interested in superconductivity.

Reviewer: K. Kamala Bharathi *of the National Institute of Standards and Technology/University of Maryland, USA.*



A Laboratory Course in Nanoscience and Nanotechnology

Gérrard Eddy Jai Poinern

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In these days of virtual reality, online courses, and streaming videos, the concept of a laboratory manual requiring students to don lab coats and learn about nanoscience by doing it is not only refreshing, but bold. This text, referred to by the author as a laboratory manual, provides a set of simple experiments that introduce some selected topics of nanoscience.

The manual consists of six chapters. The first two chapters introduce and define nanoscience and nanotechnology, as well as describe different kinds of nanomaterials and their syntheses. The third chapter covers some characterization techniques. The fourth chapter is a general discourse on laboratory safety and preparing a report. The fifth chapter is the real heart of the book: 12 different experiments are detailed. Out of these, eight involve a synthesis procedure, such as biosynthesis of silver nanoparticles, or reverse micelle synthesis of zinc sulfide nanoparticles. In addition, there are experiments on surface effects (superhydrophobicity) and microscopy—scanning electron and atomic force microscopies (SEM and AFM). The sixth and last chapter suggests in a general way some nanoscience projects.

Each lab begins with an introduction containing details of general interest on the material being synthesized or phenomenon studied. This is followed by a brief synopsis—"Key Concepts" —of the lab. The experimental section lists all reagents and supplies required for the work, and specific safety precautions. The experimental procedure is then laid out carefully, both with pictorial descriptions of the different steps, and in tabular fashion with each step in the table including space for observations and comments to be completed by the student. General suggestions for further analysis appear at the end, and finally a bibliography of relevant reading material is included.

It is a pity that the great care and detail taken with experimental description was not exercised in the overall writing of this book. Mistakes such as giving the carbon–carbon distance in the honeycomb lattice as 14.4 nm or 28.3 nm depending on direction (p. 29), stating "Speed of sound in 1 second = 343 m" (Table 1.2), or confusing text (e.g., the definition of nanotechnology is a tautology: "the modification, usage, knowledge, and development of nanomaterials, nanotools, nanomachines, and nanosystems …") will puzzle the typical student. The section on different analytical techniques is also inadequate (e.g., the description of AFM probes is unclear and contradictory; scanning electron microscopy is relegated only to a high vacuum environment, ignoring the current popularity of environmental SEM and even more recent ambient SEMs; light microscopy is treated at the diffraction limit, without mention of the recent development of super resolution microscopy). Also, in the laboratory section, there is repetition of introductory descriptions to techniques that already appeared in chapter 2. Finally, although the manual is promoted as suitable for undergraduate or even graduate level, it lacks the rigor expected at a university level. The approach taken and questions asked are completely phenomenological, lacking any quantitative spectroscopic or microscopic analysis, statistical analysis, nor is there comparison with any theory.

Despite these shortcomings, with proper classroom guidance, the experiments described here, coupled with anecdotal examples the author provides of utility of nanoparticles, could serve as a good basis for a full laboratory course.

Reviewer: Sidney Cohen *of the Weizmann Institute of Science, Israel.*

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