Modern Crystallography I (Springer Series in Solid-State Sciences)

Vainshtein, B. K.

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Modern Crystallography

A.A. Chernov

Modern Crystallography:

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Modern Crystallography IV L.A. Shuvalov,2012-01-06 Modern Crystallography IV is devoted to a systematic and up to date description of fundamental physical properties of solid and liquid crystals These include elastic and mechanical dielectric and ferroelectric magnetic and optical properties transport phenomena and spectroscopy An important feature of the treatment is its use of the crystallographic approach an introduction to which is given in the opening chapter of the book The topics are treated at a level understandable to students who have two years of university physics Researchers and engineers working on practical applications should also find the book useful as should specialists in other fields who wish to broaden their knowledge of crystallography and materials science The book is written by a group of leading scientists from the Institute of Crystallography of the USSR Academy of Sciences **Modern Crystallography I** Boris K. Vainshtein,1981-05 *Structure of Crystals* Boris K. Vainshtein,Vladimir M. Friedkin,Vladimir L. Indenbom,2013-03-14 Modern Crystallography provides an encyclopedic exposition of the field in four volumes written by Russian scientists

Structures of Crystals describes the ideal and real atomic structure of crystals as well as their electronic structures The fundamentals of chemical bonding between atoms are given and geometric representations in the theory of crystal structure and crystal chemistry as well as lattice energy are considered The important classes of crystal structures in inorganic compounds as well as the structure polymers liquid crystals biological crystals and macromolecules are treated This second edition is complemented with recent data on many types of crystal structures fullerenes high temperature superconductors minerals liquid crystals etc Modern Crystallography: Fundamentals of crystals, symmetry and methods of structural crystallography Boris Konstantinovich Vaĭnshteĭn,1994 Modern Crystallography III A. A. Chernov,1984 Modern Crystallography Boris Konstantinovič Vajnštejn,1994 Modern Theory of Crystal Growth I A.A. Chernov,H. Müller-Krumbhaar,2012-12-06 Our understanding of the basic processes of crystal growth has meanwhile reached the level of maturity at least in the phenomenological concepts This concerns for example the growth of pure crystals from a low density nutrient phase like vapor or dilute solution with various aspects of pattern formation like spiral and layer growth facetting and roughening and the stability of smooth macroscopic shapes as well as basic mechanisms of impurity incorporation in melt growth of in this sense simple materials like silicon or organic model substances In parallel the experimental techniques to quantitatively ana lyze the various growth mechanisms have also reached a high level of reproducibility and precision giving reliable tests on theoretical predictions These basic concepts and appli cations to experiments have been recently reviewed by one of us A A C in Modern Crystallography III Crystal Growth Springer Series on Solid State Sciences 1983 It has to be emphasized however that for practical applications we are still unable to quantitatively calculate many important parameters like kinetic coefficients from first principles For mixed systems such as complex oxides solutions and systems with chemi cal reactions our degree of understanding is even lower As a few examples for present achievements we note that experiments with vapour and molecular beam condensation of alkali halides confirmed the qualitatively predicted mechanisms of screw dislocations and two dimensional nucleation for layer growth Modern Crystallography: Shuvalov, L. A. Physical properties of crystals ,1981 Modern Crystallography IV is devoted to a systematic and up to date description of fundamental physical properties of solid and liquid crystals These include elastic and mechanical dielectric and ferroelectric magnetic and optical properties transport phenomena and spectroscopy An important feature of the treatment is its use of the crystallographic approach an introduction to which is given in the opening chapter of the book The topics are treated at a level understandable to students who have two years of university physics Researchers and engineers working on practical applications should also find the book useful as should specialists in other fields who wish to broaden their knowledge of crystallography and materials science The book is written by a group of leading scientists from the Institute of Crystallography of the USSR Academy of Sciences **The Quantum Hall Effect** Daijiro Yoshioka,2013-03-09 Today more than 20 years after the discovery of the quantum Hall effect the number of publications in

this field at more than one paper per day is still increasing This remarkable fact requires some explanation It also poses but perhaps also answers the question of why a new monograph entitled The Quantum Hall Effect is a highly desirable addition to the literature Originally the quantum Hall effect QHE was a term coined to describe the unexpected observation of a fundamental electrical resistance with a value independent of the microscopic details of the semiconductor device The simplest explanation of this phenomenon was based on an independent electron picture The subsequent discovery of the fractional quantum Hall ef fect demonstrated that a many body wave function and a more global view of the system is necessary to incorporate and explain interesting new aspects Today the quantum Hall effect has become a pseudonym for many differ ent phenomena observed in high magnetic fields with connections not only to solid state physics but also to theoretical descriptions in plasma physics astrophysics atomic physics and high energy physics There are even spec ulations that a higher dimensional generalization of the QHE may be useful for discussing questions related to the basic properties of space **Phase Separation in Soft Matter Physics** Pulat K. Khabibullaev,Abdulla Saidov,2013-04-17 This is the first monograph devoted to investigation of the most complex physical processes of soft systems including a wide class of solutions It blends modern theoretical understanding and experimental results proposing new methods and models for the description of several soft systems **Physics of Transition Metal Oxides** Sadamichi Maekawa,Takami Tohyama,Stewart Edward Barnes,Sumio Ishihara,Wataru Koshibae,Giniyat Khaliullin,2013-03-09 The fact that magnetite Fe304 was already known in the Greek era as a peculiar mineral is indicative of the long history of transition metal oxides as useful materials The discovery of high temperature superconductivity in 1986 has renewed interest in transition metal oxides High temperature su perconductors are all cuprates Why is it To answer to this question we must understand the electronic states in the cuprates Transition metal oxides are also familiar as magnets They might be found stuck on the door of your kitchen refrigerator Magnetic materials are valuable not only as magnets but as electronics materials Manganites have received special attention recently because of their extremely large magnetoresistance an effect so large that it is called colossal magnetoresistance CMR What is the difference between high temperature superconducting cuprates and CMR manganites Elements with incomplete d shells in the periodic table are called tran sition elements Among them the following eight elements with the atomic numbers from 22 to 29 i e Ti V Cr Mn Fe Co Ni and Cu are the most im portant These elements make compounds with oxygen and present a variety of properties High temperature superconductivity and CMR are examples Most of the textbooks on magnetism discuss the magnetic properties of transition metal oxides However when one studies magnetism using tradi tional textbooks one finds that the transport properties are not introduced in the initial stages

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