
In this book the authors have undertaken the difficult task of establishing and correlating data and concepts derived from the study of point defects in solids; much of its content is a 'unified compilation of their publications'. Their dedication to the subject matter, and their enduring and systematic efforts towards deriving and identifying its many intrinsic details, are admirable. The book carries their crusade for the acceptance of their proposition, namely that

$$g^i = c^i B\Omega,$$

directly, and as closely as possible to the reader; this is its major objective. In this key equation, the symbols g, c, B and \(\Omega\) are, respectively, the Gibbs defect energy, a constant, the isothermal bulk modulus, and the mean atomic volume; while the superscript i stands for f, m, or 'act' i.e. defect formation, defect migration (diffusion), or defect activation.

The book is divided into two parts: Part 1, Thermodynamics (six chapters, 135 pages) and Part 2, Defect parameters as a function of bulk properties, i.e. the \(cB\Omega\) model (seven chapters, 258 pages); there are also 11 appendices on various post-deadline papers (22 pages), 674 references; a list of symbols; and an author and subject index. There are 122 figures, 63 tables and 757 equations. Part 1 defines and formulates thermodynamic functions and terms (including specific heats) for the formation and migration of vacancies, Schottky and Frenkel defects in isotropic and isochoric, perfect and imperfect crystals; it then presents the analysis of experiments yielding such defect parameters by X-ray and specific heat determinations, by self-diffusion, ionic conduction, and reorientation of dipole studies. Part 2 presents the connection between defect parameters and bulk properties for the isotropic and isochoric perfect crystal, and then demonstrates the authors' interpretation of experi-

mental and theoretical results in terms of their \(cB\Omega\) model: defect entropy and enthalpy for self-diffusion, defect volume and Gibbs energy, and temperature dependence of hetero-diffusion. Experimental and theoretical data on f.c.c., h.c.p., white tin and b.c.c. metals are given and evaluated, in addition to noble gas solids, pure as well as solid solutions of alkali and silver halides. In the last two chapters various empirical laws are interpreted and an extensive theoretical discussion and treatment of the \(cB\Omega\) model is given in detail.

The authors not only present convincing arguments in favour of their \(cB\Omega\) model but also demonstrate its apparent validity for many materials; however, among these selected examples there is not one semiconductor material (such as Si, Ge, SiC, GaAs, CdTe), and, except for \(\beta\)-tin, neither is there any (so-called) semi-metal (such as Ga, As, Sb, Bi, Te). There must be a simple reason for these omissions, which any footnote could have given.

Edge dislocations and respective crystal grain boundaries can be sources as well as sinks for vacancies or interstitials, as well as conduits for, or barriers to, diffusion. One could consider them thus as causing competing diffusion paths/sequences, and mechanisms, as well as giving rise to more than one activation energy, or even a prescribed energy distribution. The question is, then, whether the diffusion rates for (low dislocation) single crystals versus polycrystals differ from one another.

The reference list is very extensive; but I missed a reference to F. A. Kroger's book, The chemistry of imperfect crystals, which has treated point defects extensively. This, frankly, surprised me.

This is a good book; it is recommended for point-defect specialists regardless of their personal stance with respect to the specific issues involved, such as the \(cB\Omega\) model. It is suited to any interested persons or students who are versed in differential calculus; after close and intensive reading of the text they will be versed in thermodynamics as well.

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