

reactions permits a clearer comparison between the two reactions.

Volume VI is highly recommended to all those who are concerned with petroleum hydrocarbons and catalysis and it is an indispensable book for all those who deal with the field of petrochemistry.

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Fortschritte der Physikalischen Chemie. Band 4. Gleichgewichts- und Wachstumsformen von Kristallen. By DR. B. HONIGMANN, Wissenschaftlicher Oberassistent am Fritz-Haber-Institut der Max-Planck-Gesellschaft Berlin-Dahlem. Dr. Dietrich Steinkopff Verlag, Holzhofallee 35, Darmstadt, Germany. 1958. xii + 161 pp. 15.5 × 23 cm. Price, M D 26.

Research and application of solids depend to a high degree on our knowledge of the fundamental processes of crystal growth and the technical preparation of single crystals of the desired quality and size. Neither of these problems is solved at present. On the other hand, the demand for new and better crystals grows rapidly. The importance and interest in single crystals is clearly demonstrated by the number of important conferences held and books published on this subject in recent years. The present book is another valuable contribution in the field of crystal growth. The scope of the book is limited to the treatment of crystal habits in the equilibrium and growing states. In the first chapter the definitions and concepts of nucleation and habits of crystals are given. In the second chapter is given a short description of crystal growth from the vapor, solution and melt. The third chapter gives the experimental data of crystal habits of covalent and ionic crystals and the influence of additives. In chapter four the experimental methods for determination of crystal habits and in chapter five methods for study of single faces are given. In the last and the longest chapter the theories of crystal habits according to Gibbs, Vollmer, Kossel, Stranski, Kaischew and others are presented. Unfortunately, some of the new results published recently, *e.g.*, by Chalmers, Sears and others, which belong to this field, are missing. This book should be very useful to anyone interested in the study or preparation of crystals.

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Der lichtelektrische Effekt und seine Anwendungen.

Edited by DR. H. SIMON, Professor an der Humboldt-Universität und stellv. Direktor des Instituts für Festkörperforschung der Deutschen Akademie der Wissenschaften zu Berlin, and DR. R. SUHRMANN, o. Professor und Direktor des Instituts für physikalische Chemie und Elektrochemie der Technischen Hochschule Hannover. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany. 1958. xii + 747 pp. 16.5 × 23.5 cm. Price, DM 97.50.

The senior authors of this book, Professors H. Simon of Berlin and R. Suhrmann of Hannover, have attempted in one volume a complete presentation of all available information concerning the photoelectric effect and its various applications to basic research and to technology. In order to cope with the complexity of such a task, five specialists have contributed the 12 chapters of the Book.

In a brief "Introduction," Chapter I (6 pages), R. Suhrmann describes the various photoelectric effects based on phenomenology rather than on modern theory of solid state physics. His use of the term photo-electromotive force, for example, in this connection is confusing and basically meaningless (43 basic references).

From the point of view of the researcher, the next two chapters constitute the important part of the book.

In Chapter II (133 pages), on "The Laws of the External Photoelectric Effect," R. Suhrmann tries to organize an enormous amount of data into a reasonably self-consistent and readable presentation of the material, a herculean and perhaps somewhat thankless task in the absence of a suffi-

ciently detailed general theory. The work of R. H. Fowler and L. A. DuBridge, which describes the photoelectric effect in pure metals near threshold, is admirably presented in its complete form, including all necessary tables.

Temperature dependence of photoemission, energy distributions of ejected electrons, correlations between optical properties of photocathodes (reflected and absorbed light intensities, polarization, etc.) and photoelectric yields—all these phenomena are treated in such a manner as to be of great aid to the beginning researcher in this field. Unavoidable discrepancies in published photo-yield measurements on the same, presumably pure, photo-cathode materials are valiantly dealt with, perhaps in excessive detail. For the beginning student it will be difficult not to be confused by the mass of experimental data concerned with crystal structure, with adsorbed foreign atoms, molecules and ions, with monomolecular and thick layers, etc., and with all their combined subtle and, in many instances, little-understood influences on the measured yields. The interpretation of an equally large number of data for composite photocathodes is closely related to the above problems with the same attendant difficulties.

Perhaps a greater selectivity of the literature discussed here might have improved the readability of this chapter. In spite of this, Professor Suhrmann did succeed in acquainting the reader with the published work on the subject matter and with its manifold problems (249 references).

"Internal Photoeffects" are treated by K. W. Böer in Chapter III (82 pages). Actually, the title is slightly misleading in as much as the work is primarily concerned with a very lucid and easy to read introduction to the concepts of solid state physics, including energy band models, crystal defects, significance of donor and acceptor mechanisms, electron excitation and recombination, and others. These phenomena are discussed systematically in terms of the important experimental parameters and supported with carefully selected data. The internal photoeffects are briefly discussed within this framework (277 references).

In Chapter IV (71 pages), H. Simon discusses the "Construction of Photocells for the External Photoeffect." Various laboratory techniques are described, in some instances perhaps unnecessarily detailed for students in U. S. universities who to-day are very rarely concerned with individual preparation of vacuum greases. Data on principally German-manufactured glasses are presented, followed by descriptions on how to produce pure metals and pure gases in the laboratory. The manufacture of some important complex photocathodes is explained in useful detail (104 references).

Chapter V (34 pages), also by H. Simon, deals in a similar manner with the "Construction of Photo-Resistive Cells (semiconductors)," with stress on selenium, thallium sulfide, lead sulfide and potassium sulfide. Additional information on spectral sensitivity, particularly in at least approximate absolute units, would have been useful (101 references).

"Secondary Electron Amplification" is discussed by F. Eckart in Chapter VI (51 pages). The yield factor as a function of primary electron energy is presented for a variety of surfaces in the form of curves and summarized in a well-referenced table. This is followed by details on construction and properties of some special compounds and alloys of high yield, such as silver-magnesium and copper-beryllium. Different mechanical forms of multipliers, with and without focusing properties, are described together with spectral sensitivity, amplification factor, dark current, noise, and other properties. A final table lists more commercially available photomultiplier tubes than this reviewer ever knew existed. All their important characteristics are included (223 references, with titles!).

In Chapter VII (132 pages), W. Leo and R. Suhrmann are describing "Methods and Apparatus for Photoelectric Measurements." A good deal of space is devoted primarily to classical electrical and electronic measuring techniques, containing some useful hints. In contrast, the remainder of the chapter goes into worthwhile detail with respect to the procedures necessary for the determination of both relative and absolute spectral sensitivity curves (115 references).

The "Applications of the Photocell to Photometry" are discussed by W. Leo and R. Suhrmann in Chapter VIII (88 pages, 91 references).

"Applications of the Photocell in Electron-Optical Image Tubes and in X-Ray Image Amplifiers" are briefly treated by F. Eckart in Chapter IX (35 pages). The basic aspects