

BOOK REVIEWS

The Solid-Gas Interface, Volume 1. Edited by E. Alison Flood. Marcel Dekker, Inc., New York, 1967. xvi + 514 pp. Price \$18.75.

The stated aim of this volume, which is but the first of two, is to bridge the increasing specialization in the rapidly developing area of surface studies on solids. To accomplish this the editor, Alison Flood of the National Research Council of Canada, has assembled contributions from a number of well-known investigators concerned with the fundamentals of gas-solid interactions. Three long chapters by Flood, Benson and Yun, and Steele, cover thermodynamics of adsorption, surface energy calculations of crystalline solids, and statistical mechanics of adsorption. These are supplemented by shorter contributions on order-disorder theory, the concept of homotactic surfaces, BET isotherms and surface area measurements, heats of adsorption and of immersion, surface structure, surface forces, preparation and evaluation of clean surfaces, as well as on physical adsorption under ultra-high-vacuum conditions. The book begins with a brief and primarily historical introduction by Hugh Taylor. Most original, however, is the final chapter; in this George Halsey single-handedly assumes the role of Greek chorus, succinctly commenting on the preceding contributions. This is a most desirable innovation, as in large measure this chapter eliminates the need for a review of the technical matter. There remains only one question: Is the aim of such a volume worthwhile, and if so, has it been successfully met?

Authoritative reviews correlating advances in different, narrow fields of specialization are badly needed to avoid inundation by the proliferating literature. A well-integrated discussion of the gas-solid interface would be particularly desirable, as remarkable progress has been made in the last decade. Especially in such a rapidly expanding area this is difficult, however. Given the variety of disciplines represented in this field, a collection of articles rather than a coherent work by a single authority is inevitable. Unfortunately the present volume suffers from the deficiencies of multiple authorship without gaining full benefit of its greatest advantage—diversity.

Although in the preface the editor stresses the impact of modern experimental and mathematical techniques, the overall tenor of the work is quite classical. The emphasis of the individual con-

tributors is largely upon physical adsorption. Chemisorption, a field in which remarkable advances have been made during the past decade, is relegated to a few dispersed comments. All but a few pages are devoted to equilibrium phenomena, with only bare mention of rate processes that have been so fruitfully explored of late. This overall cast is especially regrettable, as recent books covering the fields emphasized here are available.

Even accepting this limitation, the level of the presentations is strikingly uneven. The chapters by Benson and Yun, or Steele, for example, provide thorough and up to date though specialized discussions of their respective fields, not covered elsewhere. Some of the other contributions are short, however, and are not well supported. For example, the preparation of clean metal surfaces is examined by Professor Farnsworth, an expert in these problems. Nowhere in this book is this complemented by a discussion of experiments on clean metal surfaces or of the significance of the results so obtained. An entire chapter is devoted to the structure of surfaces, yet there is no presentation of experimental studies. Structural information obtained by electron microscopy, low-energy electron diffraction, and field-ion microscopy is not made available to the reader. In the metallurgical literature studies of surface energies and surface diffusion of metals have become more frequent, yet there is no review of this very pertinent area. Data on the energetics of chemisorption phenomena are becoming increasingly plentiful but do not receive any recognition.

In a collaborative effort, gaps, duplications, and nonuniformity are of course inevitable. These are unusually pronounced in this volume but may be partly redressed by its companion. Some of the articles will certainly prove valuable sources of information for many years. As a whole, however, the book does not achieve the integration of different disciplines, techniques and points of view. This is regrettable, considering the high price and the real need for an authoritative discussion of what is a very exciting and expanding area.

GERT EHRLICH

*Research and Development Center
General Electric Company
Schenectady, New York*