Spreading of Lenses on Water; Biliquid Foams; Polyaphrons; Applications of Polyaphrons; Invert Aphrons; Unusual Forms of Aphrons.

The Greek-derived word "aphrons" is used by the author to describe those systems which are known in general scientific usage as "concentrated emulsions". The work of *Princen* and *Lissant* and their colleagues has unfortunately been ignored, which is especially regrettable in view of the fact that modern theories on the flow behavior of foam systems originate from this group.

While the book's treatment of theoretical aspects is rather elementary, and even incomplete, the reader nevertheless finds here an extensive and hitherto unique compendium of interesting observations which the author, as an expert on this topic, has collected together. This constitutes the real worth of the book, despite some other serious shortcomings.

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Dispersing Powders in Liquids. By *R. D. Nelson*. Elsevier, Amsterdam 1988. xviii, 246 pp., bound, US $ 84.25.—ISBN 0-444-43004-0

This book is published as Volume 7 in the series "Handbook of Powder Technology" and comprises 245 pages, divided into eight well-arranged chapters. These describe the fundamental characteristics that play a role in the dispersion of inorganic materials in powder form. Unfortunately, certain materials of technical importance, for example synthetic silicas and carbon blacks, are not dealt with here. This is rather a pity, since these substances have very high specific surface areas which generally render them difficult to disperse. The reviewer also feels that the book lacks two chapters which would be of relevance for practical purposes—one about dispersers and one on the correct choice of mill base compositions. In the appendices the list of "liquids" includes only chemically pure solvents, but not, for instance, a selection of liquid binders, which are of technical importance in different fields of industry. This book is therefore not so much intended for experimentalists and technologists, but is more suited to the needs of readers with educational objectives, particularly since it deals with numerous basic physical principles. In this context, it is encouraging that the HLB value is also considered here; the fact that this value was established phenomenologically has often led to it being overlooked in scientific articles.

All in all, this small book is an ideal reference source for anyone who is not familiar with the problems relating to the surface science of materials in powder form.

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A Guide to Materials Characterization and Chemical Analysis. Edited by *J. P. Sibilia*. VCH Verlagsgesellschaft, Weinheim 1988. x, 318 pp., bound, DM 75.00.—ISBN 3-527-26867-7

This book represents a survey of state-of-the-art techniques for modern materials characterization and analysis. The book covers approximately 75 techniques that are used in characterization of chemicals, polymers, ceramics, metals and composites. The first chapter provides an introduction to how one might utilize the techniques that follow in practical problem-solving applications. Each of the following chapters describes one or more techniques, with the presentation organized according to the use of the technique, sample preparation, underlying physical and chemical principles, applications, and limitations. Due to the breadth of coverage, only a limited amount of space is devoted to each technique. However, this is adequate to introduce the technique; several references are listed after each section, providing in-depth detailed information for the reader who is interested in a more rigorous treatment.

This is a valuable book for materials laboratories and general industrial laboratories where characterization and analysis of many different substances may require several different techniques. It serves as a good review for established scientists as well as a useful resource for beginners.

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DECHEMA Corrosion Handbook, Vol. 2. Edited by *D. Behrens*. VCH Verlagsgesellschaft, Weinheim 1988. x, 340 pp., bound, DM 775.00.—ISBN 3-527-26653-4

The DECHEMA Corrosion Handbook—a series of at least twelve volumes is planned—is a completely new English edition of the DECHEMA Werkstoff-Tabelle.

The second volume (340 pages) describes the corrosion properties of metallic, non-metallic inorganic, and organic materials in corrosive media of aliphatic aldehydes, ammonia and ammonium hydroxide, sodium hydroxide and the underground corrosion in soil. The largest parts of this volume are devoted to sodium hydroxide (154 pages) and soil (90 pages).

Some errors of the first volume which had earlier been criticized by the reviewer have been corrected in Volume 2. As an example, some electrochemical reference systems are now mentioned in the introductory part of some chapters, but in addition to these many others are mentioned in the detailed descriptions of the corrosion behavior of the different materials. In subsequent volumes a list of all these reference systems should be included in the introduction, citing also their potentials versus the Standard Hydrogen Electrode.

In general, the clearly arranged layout of the first volume is continued in the second volume. Much valuable in-

formation concerning the corrosion behaviour of widely different materials has been carefully collected, taking into account the literature up to approximately 1985.

The first chapter, which discusses the corrosion properties in solutions of aliphatic aldehydes, contains a very well written introduction which describes the most important technical processes in which aliphatic aldehydes are used, and gives a summary of the most important corrosion problems. The different aldehydes are then described in detail, including a short summary of the corrosion problems that may arise for the given aldehyde in a given technical application. This descriptive part is more informative than the short summary table, which gives only general ratings for the different materials.

The same is true for the second chapter, which describes the corrosion behavior of materials in ammonia and ammonium hydroxide. Again, the introduction is well written, summarizing technical processes in which ammonia participates, and discussing major corrosion problems such as H-embrittlement in these solutions. The detailed description of the individual corrosion properties of the different materials is accurate and careful. In some cases, however, the electrochemical background of the corrosion process in electrolytes should have been presented more clearly, e.g. in the discussion of the activation of the corrosion process by O_2 (p. 58), or in the description of the "chemical conversion process" of the corrosion induced by O_2 (p. 55). Reference should have been made here to the electrochemical nature of the corrosion process, the O_2-reduction being the cathodic reaction.

Chapter 3 is devoted to corrosion in alkaline environments. In contrast to Chapters 1 and 2 the introduction is rather short, and presents only limited information on the technical processes in which NaOH is used, the practical corrosion problems, etc. The introduction provides some general information concerning pitting corrosion, pitting potentials and stress corrosion cracking. However, this information is rather limited, and should have been incorporated into a chapter devoted to basic corrosion mechanisms, which is missing from the Corrosion Handbook. The corrosion properties of the individual materials are discussed in great detail, with special emphasis on the corrosion of metals under conditions of stress corrosion cracking. After discussing the individual metallic, non-metallic inorganic, and organic materials, tables are presented which summarize the corrosion properties of these materials in different NaOH solutions at different temperatures, etc. These tables are quite informative to the reader. A point of criticism to the reviewer is the rather frequent statement of electrode potential without any reference system (Figs. 11, 20, 22, 23, ..., Table 11 ...). As an example, Fig. 19 shows the lifetime of an unalloyed steel in 33% NaOH as a function of the electrode potential. The result of this technically important figure is that stress corrosion cracking is observed only in a very limited potential range. However, the potential axis is given in "Volt" without any reference, and consequently the figure could be quite misleading to inexpert readers. The number of reference systems used in the Corrosion Handbook is quite large (Ag/AgCl, $Cu/CuSO_4$, Hg/HgO, SME? page 112) and these should be summarized in the introduction.

The last chapter is concerned with the underground corrosion in soil. The introduction covers about 30 pages and describes the chemical composition of different soils, their corrosivity, corrosion due to microorganisms in soil, and the possibilities for protecting metallic materials in soil, e.g. by cathodic protection. In general, this part is well written and quite informative, but the electrochemical aspects of cathodic protection could have been presented in more detail, in a better arranged and more compressed form, without repeating the same facts—e.g. the correlation between organic coating and cathodic protection—in many places throughout the text. Some techniques which are used to measure the correct protection potential—e.g. switch-off potentials—are mentioned later in this chapter, and these too should have been incorporated into the introduction. The rest of the chapter is well written and, for example, clearly shows the importance of correctly chosen organic coatings for the corrosion protection of steel pipes which are polarized cathodically.

In summary, the second volume of the DECHEMA Corrosion Handbook is a highly valuable reference book for all engineers working in the area of corrosion, provided the user has a thorough knowledge of the basic physical concepts in corrosion science.

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Semiconductor Electrodes. Edited by *H. O. Finklea*. Elsevier, Amsterdam 1988. xxii, 520 pp., bound, DFl. 340.00.—ISBN 0-444-42926-3

Continuing the series "Studies in Physical and Theoretical Chemistry" (Elsevier) a new edition entitled "Semiconductor Electrodes" is now available (Vol. 55). The ten chapters by different authors are devoted to particular semiconductor electrode materials. Following a concise and well written introduction by *H. Finklea*, Chapter 2 describes the photoelectrochemistry of the large band gap oxides TiO_2 and $SrTiO_3$. A wealth of information on physical and photoelectrochemical properties is presented in this chapter. The inclusion of basic experimental aspects such as ohmic contacts, electrode preparation and sample mounting is definitely an advantage for the interested reader. Chapters 3 and 4 deal with other less intensively investigated semiconducting metal oxides (Fe_2O_3, SnO_2, In_2O_3 and WO_3). Here, too, valuable information on electrode preparation and growth methods is given, in addition to the detailed analysis of the photoelectrochemical behavior.