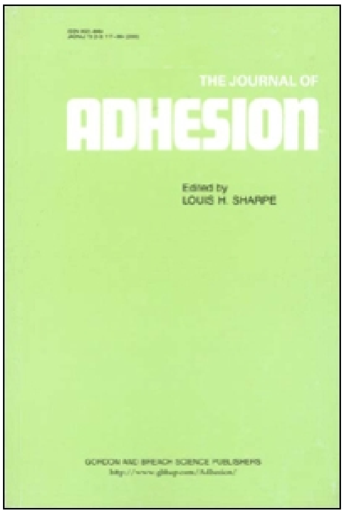
This article was downloaded by:
On: *22 January 2011*
Access details: *Access Details: Free Access*
Publisher *Taylor & Francis*
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



The Journal of Adhesion

Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713453635

Book Reviews

To cite this Article (1986) 'Book Reviews', The Journal of Adhesion, 19: 2, 179 — 183
To link to this Article: DOI: 10.1080/00218468608071221
URL: http://dx.doi.org/10.1080/00218468608071221

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.informaworld.com/terms-and-conditions-of-access.pdf

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

ADHESION 9, edited by K. W. Allen, Elsevier Applied Science Publishers, London and New York, 1984, 198 pp. ($52.50).

The latest volume in this well-established series is based on the proceedings of the Annual Conference on Adhesion and Adhesives, held at The City University, London, in 1984. As usual, the contributions are quite diverse, but lean strongly toward matters of industrial importance. The list of contents is as follows:

1. *Textile-to-Rubber Adhesion: Theory and Practice* (Wootton). A fairly detailed review of current practice for optimizing polyester and nylon tire cord adhesion; newer fibers are mentioned only briefly.

2. *Aspects of Adhesion Promotion with Flexible Coated Fabrics* (Holker and Sagar). Polyurethane coatings on nylon, using a polyacrylic acid treatment to promote adhesion.

3. *The Adhesion of Some Ethylene-Vinyl Acetate Copolymers Applied as Hot Melt Coatings to Metals* (Hatzinikolaou and Packham). Effects of substrate preparation and copolymer composition.

4. *Formation of Indium Bonds for Ultrasonic Systems and Examination of Metal Diffusion Bonds by Scanning Acoustic Microscopy* (Frew, *et al.*). Bonding quartz transducers with indium, and a brief review of one type of SAM technique.

5. *Adhesion Mechanism of Thick Film Conductors* (Coleman). These are fabricated by sintering a metallic ink onto an alumina substrate; effects of fluxes and substrate structure are discussed.

6. *Scanning Laser Acoustic Microscopy with Some Applications to Adhesion* (Arnold and Reiter). Description of an alternative method for conducting scanning acoustic microscopy.

7. *Epoxy Adhesive Formulation: Its Influence on Civil Engineering Performance* (Lark and Mays). Description of the results of standard physical tests on several cold curing epoxy resins which might be used for bonding civil engineering structures.

8. *Structurally Bonded Vehicles: Design and Production Considerations—Implications for Adhesive Formulation* (Lees). A fairly detailed review, perhaps more suitable for an audience of automotive design engineers with little knowledge of adhesive technology.

9. *Moisture-Cured Polyurethane Sealants Modified with Bitumen-Isocyanate Adducts* (Kozakiewicz and Lendzion). Results of rheological and shear strength testing of some experimental formulations.

10. *Inelastic Electron Tunneling Spectroscopy and the Adhesive Interface* (Comyn). Use of a relatively new technique to study interactions of epoxy resins and silanes with metal oxides.

11. *Monitoring Adhesive Solvent Vapors in the Footware Industry* (Denton). A description of current safety engineering practice, which may provide some useful ideas for others who are concerned with large scale use of organic solvents.

12. *Spontaneous Shear Delamination of Adhesive Joints* (Barquins). A theoretical study of the kinetics of peeling of a viscoelastic layer from a stressed elastic substrate, using the fracture mechanics concepts developed in the author's previous publications, some of which have appeared in earlier volumes in this series.

As can be seen, this is quite a varied group of papers, not all of which are likely to be of interest to any given individual. The value of this series might perhaps be enhanced by directing its subject matter toward a narrower spectrum of readers.

GEORGE F. HARDY

SURFACE AND COLLOID SCIENCE—Volume 13, edited by E. Matijevic and R. J. Good, Plenum Press, New York and London, 1984, 287 pp. ($45.00).

This is the thirteenth volume of what has become a treatise on a variety of subfields in colloids and surface science. The Editors, Matijevic and Good, do a splendid job both by prevailing on leaders in the subfields to prepare significant reviews and by careful editing thereafter. The typesetting is excellent with numerous graphs and so this series is easy to read. Several quirks, however, are annoying. The present volume has no list of authors (other volumes do) in the beginning. The address of the authors comes as a footnote after the Table of Contents and at the bottom of the first page of text.

The current volume presented unusual publication problems. The author of the first chapter on the electrochemistry of oil-water interfaces

(70 pages, much the largest in this volume) was Akira Watanabe from the Nara Women's University. He died shortly after he put this chapter together. Then the editors got Professor S. S. Dukhin of the Institute of Colloid and Water Chemistry, Kiev, to review the chapter since it did not have a final reading by Watanabe. The amendments by Dukhin are carried as footnotes with additional references. The electro-chemistry of the oil-water interface needed a new review. We can be pleased that such a good survey was written by Watanabe before his death.

In Chapter 2 on the kinetic theory of flotation of small particles, Derjaguin and Dukhin, together with Rulyov, have amended and supplemented the ideas developed two decades ago. They find that as the size of particles and bubbles decreases, the inertial forces affecting the process of their approach to each other, the formation of a bubble-particle aggregate, and the destruction of the aggregate decrease drastically. As the inertial forces decrease, the influence of viscous forces on these processes increases. These forces especially interfere with the process of thinning out of the interlayer between the surfaces of a particle and a bubble. In this case, as compared with the case of large-sized particles, long-range surface forces in an elementary flotation act grow in importance.

Therefore, the flotation of small-sized particles obeys the general principles which have been intensively studied during the postwar decades in connection with the general problem of the stability of colloids controlled by surface forces. Extension of these principles to the flotation of small-sized particles required, first, the inclusion of the hydrodynamic factor because particles deposit on a bubble from the stream of liquid flowing around it and, second, consideration of mobility of the bubble surface. This second factor is manifested to the greatest extent in flotation. If this factor is disregarded and if a bubble is considered as a rigid particle, then the kinetic theory of flotation can be based on Derjaguin's heterocoagulation theory.

Carel J. Van Oss brings together in Chapter 3 a fine summary of the present status of precipitate membranes. When two ionic species that can form a precipitate are brought together by diffusion and are allowed to interact inside the pores of gels, membranes or other porous structures, precipitate membranes are formed that have a number of unusual properties. The first such membranes were described by Pfeffer; they were formed by allowing an aqueous solution of a cupric salt on one side of a porous ceramic wall to diffuse toward and interact with a potassium ferrocyanide solution placed on the other side of the ceramic wall. Inside the wall (generally a ceramic jar) an apparently continuous semipermeable membrane of cupric ferrocyanide, or "pfefferian jar", was created, endowed with pores of a very small size.Beutner studied the electrical properties of cupric ferrocyanide membranes formed in 10% gelatin containing 0.025 M $K_4Fe(CN)_6$ in the gel, in contact with a 0.05 M $CuSO_4$ solution, which yielded a potential difference of 115 mV; he demonstrated that this system behaves like a reversible potassium electrode. With cupric ferrocyanide membranes formed in parchment, Donnan measured membrane potentials and ultimately developed his theory of membrane equilibria.

While cupric ferrocyanide membranes are impermeable to sugars, and also to CU^{2+} and $Fe(CN)_6^{4-}$ ions, they are permeable to water and to other small ions such as K^+, which allows their function as a reversible potassium electrode. In the early 1960s, Hirst-Avalon noted that $CaCO_3$ membranes formed in cellophane and parchment paper, and $BaSO_4$ membranes formed in cow-gut, pig's bladder, gelatin film, cellophane or parchment paper, as well as calcium oxalate membranes, all had the same peculiar property in common with $Cu_2Fe(CN)_6$ membranes; *i.e., a specific impermeability restricted to the ions that formed them.* This general phenomenon, which one may entitle the Hirsch effect, formed the basis for a complete explanation of the Liesegang phenomenon of periodic band precipitation on porous media, as well as for the qualitative and quantitative interpretation of precipitate band formation by double diffusion of antigens and antibodies and other complex-forming substances.

Finally, although it is less than widely realized, the Hirsch effect effectively accounts for the mechanism of one class of ion-selective electrodes, *i.e.*, those of the precipitate type.

In Chapter 4, developed by J. Adin Mann, measurement of dynamic surface tension is coupled with the necessary theoretical explanations. Adin includes the relatively new field of the spectroscopy or ripples, which he predicts will grow to great importance. The style of writing that Adin adopts can be said to be a teaching mode; it is interesting to follow.

Chapter 5, also by J. Adin Mann, widely differs from the subject matter in any of the other volumes in this series. It deals with digital computer-oriented numerical analyses in surface chemistry. The "need to know" syndrome suffices to have this material, because surface chemists are likely not to be exposed to the accomplishments of numerical methods coupled with a computer. Modern experimental techniques provide so much data that could not be handled otherwise.

Mann deals with the evolution of capillary ripple methods to make his point. These form a pair with the material presented in Chapter 4. It is slow going for the uninitiated.

Chapters 6 and 7 deal with mercury intrusion measurements for obtaining pore size distribution by this direct method. The "state of the art" is set forth in Chapter 6 by Winslow with regard to instrumentation. What we need in meaningful contact angles for Hg inside the pores. Good, in a footnote chapter, decides that 130° to 140° should be chosen, to agree with the choices made by most investigators, yet 170° to 180° is found to be pertinent for some systems. The complexity of pore systems makes it difficult to choose what to do.

A. C. ZETTLEMOYER
Sinclair Laboratory
Lehigh University
Bethlehem, PA 18015, U.S.A.