

## Book Review

---

### *Advances in Sonochemistry, Volume 3*

T.J. Mason (ed.), JAI Press, London, England, and Greenwich, Connecticut, 1993, x + 292 pages, £53, USD90.25 (hardcover)  
ISBN 1-55938-476-X

This latest volume in the series contains eight articles covering a wide range of topics by well-known workers in their respective fields. Several of the articles, those by Walker (Ultrasonic Agitation in Metal Finishing), Morgan (Ultrasonic Atomization), and Evans (Use of Ultrasound in the Identification of Biological Molecules), contain little or no synthetic chemistry but give useful reviews of areas of applied chemistry in which ultrasound has had a significant impact. Thus, for example, electroplating is aided by ultrasound, sprays with controlled particle size are important in the coatings industry, and the passage of ultrasound through biological materials is of interest in medical physics.

Two further articles, that by Henglein (Contributions to Various Aspects of Cavitation Chemistry) and that by Gillings (Ultrasound and Colloid Science: The Early Years) are retrospective reviews of the early years of sonochemical research which give a fascinating insight into how the foundations of work concerned with the effects of cavitation on various materials were laid. For those interested in the relatively "new" field of sonochemistry it is well to be reminded that the effects of ultrasound on the viscosity of liquids was studied in the 1930s and that the use of ultrasound to generate free radicals was being pursued vigorously in the 1950s.

Perhaps the articles of most interest to readers of this journal will be those by Luche (Sonochemistry:

From Experiment to Theoretical Considerations), by Zinov'ev and Margulis (Reactions of Organosilicon Compounds in Acoustic Fields), and by Morcky and Starchevsky (Initiation and Catalysis of Oxidation Processes of Organic Compounds in an Acoustic Field). The review by Luche is of particular interest as it covers his work on the thorny issue of why some chemical reactions are accelerated by placing them in an acoustic field and why others appear to remain unaffected. His classification of reactions into the three classes, homogeneous, heterogeneous ionic, and heterogeneous radical or ambident, goes some way to assessing the likelihood of a particular reaction being affected and will probably cause many readers to go back and reappraise their own "failed" sonochemical reactions. The review covering organosilicon chemistry will certainly be of use to those in the field as it covers a wide range of reactions of importance, such as the cleavage of the siloxane linkage and the formation of Si-Si bonds. The effects of ultrasound on catalysts has not been investigated as thoroughly as some fields but the final article brings together useful references in the area.

The content of this book provides historical background about why sonochemistry is where it is today and how it may be applied in many situations. The book is well produced and reasonably priced, and should find a place in all chemistry libraries.

**Paul D. Lickiss**

*Department of Chemistry,  
Imperial College of Science, Technology and Medicine,  
London, SW7 2AY  
UK*