ELSEVIER

Journal of Photochemistry and Photobiology A: Chemistry 98 (1996) 187

Journal of PHOTOCHEMISTRY AND PHOTOBIOLOGY A:CHEMISTRY

Book Review

Surface Electron Transfer Processes
by R.J.D. Miller, G.L. McLendon, A.J. Nozik, W. Schmickler and F. Willig, ISBN 1-56081-036-X, VCH, Weinheim, 128 DM.

This book provides a thorough and in-depth treatment of the subject of electron transfer processes at surfaces. It is a unique text providing an integrated approach from a variety of fields involving electrochemistry, photoimaging science and catalysis. Such fields have important implications in the future development of solar energy conversion and environmental process technologies. Electron transfer processes are central to the mechanisms involved and this book provides a very comprehensive treatment of these processes covering a wide range of surfaces and structure in a unifying manner.

The book comprises a total of five authors all of whom have contributed to separate chapters. Unlike the usual edited texts however, the content of this book inter-relates well and is nicely presented and illustrated. The authors claim to have organised and written the book along the lines of a tutorial approach, taking the reader through the basic theories to a more comprehensive presentation of the actual electronic and nuclear factors influencing surface reactions. This they have done well making the book highly readable and useful especially for teaching advanced courses on the subject. Fundamental theories and theoretical models are analysed and critically evaluated throughout the book coupled with detailed experimental studies, current methods and reaction mechanisms. A wide selection of examples are provided in each chapter backed by extensive and up-to-date literature citations.

Chapter 1 provides a useful overview of electron transfer processes concentrating on the inter-relationship between electronic processes and the reaction coordinate. Chapter 2 provides an inter-link on the theories of electrode processes for semiconductors while Chapter 3 provides both a semi-classical and full quantum treatment of electronic coupling processes in interfacial electronic transitions from an electrochemical perspective. Electron transfer processes at metal and semiconductor surfaces is described in Chapter 4 with complimentary dye-sensitised processes following through in Chapter 5. Here, picosecond time domain approaches are used to describe the basic issues of interfacial charge-transfer. The final chapter, 6, describes electron transfer processes from the view-point of quantum mechanical considerations. In all, the book provides a unique probe of the inter-relationship between electronic structure and interfacial electron transfer processes.

This book is a valuable text for both the graduate, post-graduate student and chemist working in the various fields encompassing or related to surface electron transfer processes. It is also highly recommended for chemical engineers and physicists concerned with developing relevant technologies.

Professor N.S. Allen
The Manchester Metropolitan University, UK

Elsevier Science S.A.