The author has achieved his objective with the 3rd edition of this successful book. The price of the book may preclude it as a compulsory textbook for many engineering students, but because of the amount of information it contains, I will be getting a copy for personal use. The book will, however, be a recommended purchase for the engineering library.

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Electronic and Photonic Applications of Polymers

M. J. Bowden and S. R. Turner (Eds)
American Chemical Society, Washington D.C., 1988, 372 pp., $94.95 (US and Canada), $113.95 (Export)
ISBN 0-8412-1400-X

This book is based on the plenary papers presented at an ACS symposium which took place in 1986, though the manuscripts of the material appearing here were completed in the summer of 1987. Like most books constructed in this way it shows both the strengths and weaknesses of its origins. On the one hand one has the advantages of the specific knowledge and expertise of the various authors but, on the other hand, one is conscious of a degree of overlap in the chapters written by the different authors and of a certain unevenness in the point of view and in the style of presentation. This latter problem is, perhaps, inevitable in a book which deals with subjects which have reached such disparate levels of development. These range from the well established technology of the photo-resist materials used in the fabrication of microelectronic devices based on silicon, to Langmuir–Blodgett films and conductive polymers which, despite the large amount of effort devoted to their study, have yet to find a place in the manufacture of marketable devices.

After an introductory chapter, nearly half the book is taken up with lengthy and authoritative accounts of materials and processes for the implementation of the photo-resist technique both in conventional wavelength regions and also in the deep ultraviolet. Both the polymer chemistry and optics of these subjects are discussed. Shorter chapters follow, devoted to Langmuir–Blodgett films, conducting polymers, polymers in non-linear optics and polymers in optical recording.

Much of the chapter on Langmuir–Blodgett films deals with materials which are not polymeric and indeed, the author of this section appears to be pessimistic about the application of polymers in this field. This view is surprising as most non-polymeric Langmuir–Blodgett films are susceptible to thermal and mechanical damage and so are less likely to be useful in the formation of practical devices than are polymers.

Conducting polymers have provided a happy playground for a number of theoretical physicists and it is possible that it is partly for this reason that so much experimental effort has gone into this field. So far these materials have failed to find an application. The one possible practical application of conducting polymers which has appeared is in the construction of light-weight batteries. This topic is briefly referred to in the introductory chapter but is not discussed in the chapter devoted to conducting polymers.

Polymers in non-linear optics have reached a point at which simple demonstration devices can be made, but much remains to be done to achieve a viable technology. As the progress in this field has been extremely rapid it is not surprising that the chapter devoted to this topic is slightly dated but it nevertheless gives a good general account of the ground rules and problems of this field. The same comments are valid in regard to the chapter on optical recording in which there is no mention of the, admittedly non-polymeric, process to which ICI has committed a sizeable plant.

Two important applications of polymers in electronics have been largely ignored. One of these is the fabrication of magnetic data storage devices such as audio tapes, video tapes and floppy discs. It may be argued that the technology involved here is so well established as to be no longer of interest. However, hardly a week goes by without a new Japanese patent appearing in this field. Even allowing for the Japanese passion for patents, surely this is significant. The other topic which I should like to have seen addressed is electron beam lithography which is only briefly referred to in chapters devoted to other subjects. Here again, when a count was made a few years ago, there existed already 50 e-beam machines in Japan but only eight in the UK, one of which did not work properly! The point of the e-beam technique is that, using electrons rather than photons, it is possible to obtain very much higher resolution than in photolithography. The electron beam is computer controlled and scans the resist surface in a sequential manner so that, as a direct manufacturing technique, e-beam lithography is impossibly slow. However, it seems about the only way to make masks suitable for the very high resolutions which deep u.v. and even shorter wavelength synchrotron radiation could lead to.

Notwithstanding the criticisms given above, I believe that this is about as good a book as one can expect given the rapid evolution of many of the topics discussed and the difficulties which the authors must have had, given this rapid progress, to give a reasonably up to date and comprehensive account of their subjects.

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Conductive Polymers and Plastics

J. M. Margolis (Ed.)
Chapman and Hall, London, 1989, 179 pp, £35.00
ISBN 0-412-01431-9

The area of conducting polymers has been intensively researched over the past decade and publications on this topic excite considerable interest of both a specific and general nature. Consequently the list of monographs and reviews has rapidly expanded in order to keep pace with the new published work.

The latest addition to this area is a modest volume of 174 pages of text which is divided into four chapters, two of which fall under the general heading of "Polymers" and the remaining two under the general heading of "Plastics".

Chapter 1 deals with electrically conductive polymers and gives an overview of progress up to and including 1987. The presentation is, however, somewhat unbalanced and less than comprehensive, tending to reflect perhaps specific interests of the authors rather than giving a broad brush approach. This may be a consequence of the multiauthorship (five contributors) which makes uniformity difficult to achieve.

Chapter 2 describes ionically conductive polymer–salt mixtures, where the ion is now the charge carrier, and contains useful sections on some of the applications relevant to these polymer–salt systems, which are often missing from some of the previous reviews on this subject. This helps to place the research in a practical context, and helps to make it a somewhat more successful chapter than the first.

Chapter 3 is concerned predominantly with metallic plating and coating on plastics and presents the subject from a technological point of view. Practical methods are described for preparing these coated products but the relevant application section is quite short. This chapter should perhaps be regarded as an introduction to Chapter 4 which deals with various aspects of conductive plastics together with a summary of the test methods used to characterize their properties.

While Chapters 1 and 2 are adequately referenced it is unfortunate that there are no references for Chapters 3 and 4. This will be a disadvantage to the general reader who is seeking more information on these topics, particularly as these chapters are probably the most useful in that they cover topics not frequently drawn into the review format.

From an academic standpoint I find it difficult to be enthusiastic about this book; much better reviews of the topics in the first two chapters have been published. However, the applied scientist will probably derive more benefit from the material in Chapters 3 and 4 where there is a considerable amount of valuable practical information gathered together for easy consultation.

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