

Surface Coatings-1

Edited by
Alan D. Wilson
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and
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Preface

The field of surface coatings is now so extensive, and is developing so rapidly, that no individual person could be expected to master it in its entirety. Hence, the days have gone when a lone author could compile a comprehensive treatise on the topic without overlooking many of the most significant developments. Yet the very growth and diversity of surface coatings make it essential that workers in the field should have access to up-to-date and authoritative reviews.

It is to satisfy this need that we have assembled our team of authors, each of whom is an expert in his or her branch of the subject, and is well able to assess what is most significant and exciting within that branch. They have been encouraged to develop their themes in what they have felt to be the most appropriate way, with minimal editorial interference from us. We believe that the results of their labours will be of benefit to those engaged not only in basic research, but also to those working in product development and in testing and evaluation of coatings.

In preparing this and subsequent volumes, we have taken the broadest possible definition of the field of surface coatings. We have not allowed ourselves to be artificially restricted, for example, to paint technology, to metal finishing or to surface analysis. We believe that this breadth of approach will increase the usefulness of these volumes, since technical and scientific advances so often arise from the transfer of ideas from one part of a discipline to another.

Surface coatings are no longer seen as being synonymous with oleoresinous paints applied by brush or spray to protect building

structures against the elements. There are now additional and stringent requirements from the high-technology sector; examples include the protection of electronic equipment from electromagnetic radiation and gas turbine blades against high-temperature blasts from the corrosive products of fuel combustion.

Nor are coatings regarded solely as those impervious and inert barriers for the protection of building structures. Increasing attention is being paid to coatings that play an active rather than a passive role. One example is described by Blunden and Hill in Chapter 2 of this volume, namely the organotin and antifouling paints. This chapter also highlights the environmental concern that has been expressed about these systems and reviews the steps being undertaken to reduce problems of pollution. Another important environmental problem is the emission of solvents. One approach to the reduction of this hazard has been the development of the high solids coatings which have a low solvent content and this technology is described by Storey in Chapter 3.

How well does a coating perform in service? This answer can be given by extensive field trial in various parts of the world but this task absorbs resources and takes time. Although it is appropriate for a fully developed product, it is clearly not suitable for the researcher developing new formulations. He needs rapid results for the future guidance of his experimental plan. This subject of controlled accelerated testing in the laboratory is dealt with by Falla, who, in Chapter 4, reviews new developments including the recently developed use of plasma etching at the Paint Research Association.

The essence of the philosophy of scientific technology is that scientific understanding forms the logical base from which to promote technological advances. In Chapter 5 Watts describes the X-ray photoelectron spectrometer which is a powerful tool for assessing performance by analysing the various causes of failure. The prerequisite for any coating system is that it adheres to the substrate and this fundamental topic of adhesion and methods of promoting adhesion are described by Walker in Chapter 6. Film formation is likewise of fundamental importance and Knauss describes in Chapter 7 the technique of molecular relaxation for following this process. In all, this volume touches on a number of vital areas of knowledge which are essential to those engaged in the research, development and application of coatings.

To conclude, we want to take this opportunity to thank all of the

authors who have contributed to this first volume. Their ready co-operation has greatly eased our task as editors.

ALAN D. WILSON
JOHN W. NICHOLSON
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