

Preface

One of the most effective ways of enhancing the performance of industrial components is to engineer the surface so as to make them suitable for functions that are different from the primary function of the bulk substrate. Although surface engineering has been practised from the ancient times, the science and technology of surface modification technology has been explored only in last several decades. Major progress in this direction has been achieved only when a significant gain in performance along with financial benefit is realised by practising surface modification techniques. Numerous choices for modification of the surfaces are available today; one needs to consider the thickness and adhesion of the modified layer, its interaction with environment, mechanical process and substrate. Selection of coating will be governed by component specification, functional and non-functional requirements, coating and process characteristics and economic implications. Thus the aim of this book is to guide one to select the most suitable process and the layer for a given application. This attempt is by no means the last word rather it is just initiation.

This book consists of eight chapters written by experts in various fields in surface engineering. The book begins with tribology of thermal-sprayed coatings. In this chapter, various thermal-sprayed coatings, their features, advantages, disadvantages and tribological performances are discussed. Typical applications of thermal-sprayed coatings with few examples are also highlighted. This is followed by a chapter on nanocomposite films for wear resistance applications. This chapter contains deformation behaviour of nanostructured films in addition to their microstructural features, mechanical properties and tribological performances. Chapter 3 deals with diamond films and their tribological performances. Various deposition techniques and microstructural characterisation of diamond films have been provided in this chapter along with the influence of various parameters on tribological and nanotribological performances of these films. Diffusion-treated surfaces and their tribological properties are the subject matters for Chap. 4. Chapter 5 concerns with the details of hardfacing for wear erosion and abrasion. Various hardfacing processes, mechanical properties, sliding wear, abrasive wear and erosive wear of various hardfaced surfaces are described in this chapter.

Electroplating for tribological applications is outlined in Chap. 6. After introducing electrolytic and electroless plating technologies, a description of sliding wear performances of plated surfaces is made. Laser surface modification is the subject matter of Chap. 7 in which tribology of laser-modified surface has been discussed. Finally, surface engineering of bio-tribological application is made the concluding chapter of this book. Tribology of various bioactive, bioinert and biotolerant coatings for human body applications forms the main focus of this chapter. Each of the above chapters contains a summary and perspective for future study.

Although this book can be utilised both as a text book and as a reference book, one of the major objectives of this compilation has been to highlight the many recent developments in the field of tribology of coatings. The book targets undergraduate and post-graduate students, practising engineers, researchers in various academic institutions, research establishments and production units. It is expected that this book will be a valuable guide and a useful reference for those who are working in the area of surface engineering for enhanced wear performances.

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Manish Roy, Ph.D

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