Preface

There is extensive interest in the development of new and improved composite materials. This is particularly true for composite systems based on metallic and ceramic constituents. While some of the systems under development are based on the conventional geometric arrangement of aligned fibres surrounded by a matrix, there is also interest in particulate reinforcement and in multi-layered structures. In all of these cases, the characteristics of the interface are of central importance. This is especially true for all-ceramic systems, in which the toughness can be dramatically raised by the presence of weak interfaces. In metallic-based systems, on the other hand, it is usually beneficial for the interfaces to be strong. This is also true for joints between metallic and ceramic components and for interfaces between metallic substrates and ceramic surface coatings. There is great incentive, therefore, for improved understanding of the nature of interfaces between constituents in such composite systems and of the factors that affect their mechanical characteristics.

In this volume, various aspects of the structure and mechanical behaviour of interfaces in composite systems are covered in a systematic manner. The range of coverage was decided in late 1994 and papers on selected topics were invited from about 25 authors of international standing. The majority of these authors accepted the invitation and delivered camera-ready manuscripts covering the key areas by the deadline of summer 1995. The format of the collection is therefore much as originally planned. The papers have been grouped under five headings, covering studies of interfacial structure, interfacial testing techniques, microstructural control, correlations with composite performance and the behaviour of layered systems. Some of the papers are overviews of recent work, while others present detailed results on specialised topics. Together they represent a timely and authoritative documentation of the state of the art in this very important field.

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