

**Computational Methods
and Experiments
in
Materials Characterisation II**

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Preface

Characterisation is the connection between an abstract material model and its real-world behavior. It allows one to predict the response of the material under an arbitrary set of conditions based on a finite series of tests. In some cases, the model does not have a closed-form solution, but is cast in terms of differential equations that are solved numerically. The solutions for a particular set of boundary conditions can be related to a set of material parameters which characterise the material.

As increasingly high performance is sought, engineering materials are becoming ever more complex. As a consequence, characterisation is increasingly difficult. A trend is being established where characterisation proceeds through a combination of numerical modeling and experimental testing. Several papers in this book describe such an approach.

Increasingly high performance is in many cases sought through the small scale. Hence, much attention is given to the micro-and nano-structure of materials. Experimental techniques for small-structure characterisation are becoming more sophisticated as diagnostic equipment and data processing merge. Optical and electron microscopy is often coupled with digital image processing. X-ray microtomography is a particularly effective way of obtaining 3-D micro structural information. These methods are the topic of several papers.

Industrial applications are the driving force behind the development of a wide variety of materials, from concretes to foams to special surfaces. While the research and techniques which aid in the development of such materials are the primary focus of the conference, it is appropriate, as well as informative, to include a number of applications-oriented papers in this book.

With the hope of providing useful information to practitioners in the materials research area, the Editors also wish to thank their colleagues in the Scientific Advisory Committee, who helped to ensure the quality and appropriateness of the papers in this book.

The Editors,
Portland, Maine, 2005

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