

COMPUTATIONAL MODELING OF MATERIALS, MINERALS AND MET- ALS PROCESSING

COMPUTATIONAL MODELING OF MATERIALS, MINERALS AND MET- ALS PROCESSING

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FOREWORD

Materials, minerals and metals processing technologies are very complex and often operate through a fine balance of a range of competing mechanisms. The only effective way to design, analyse and optimise these processes is through the development and exploitation of computational models. Such models have to represent all the component physics and chemistry and their interactions, plus the engineering constraints with respect to materials and what can be implemented. Increasingly, computational modeling (CM) is the means by which all the key factors that affect the operation of a process can be analysed in a rational manner. Such models provide a framework within which we can embed much of our understanding of process operations.

The objective of the international conference, the Computational Modeling of Materials, Minerals and Metals Processing, of which this book is the proceedings, was to bring together leading workers from around the world to share their advances in all aspects of this emerging discipline. Computational modeling attracts workers from across the scientific spectrum - applied mathematics, computer science, engineering and materials science. The meeting pursued a number of modeling themes involving fluids, heat transfer, phase change, reactions, magneto-hydrodynamics, thermo-solids analysis, involving both their interactions and multiple length scales. The keynote speakers covered a wide range of techniques, problem classes and applications, including the challenges of optimisation in the context of computational modeling. Key challenges include the modeling of multi-scale and multi-physics phenomena, both of which are particularly significant in the context of materials, minerals and metals.

The meeting brought together developers of computational modeling software tools, their users in the development of models, and engineers in their application to the design, analysis and optimisation of industrial processes. This proceedings records a mixture of invited and contributed papers – and all the papers published in this volume have negotiated a peer review process. The editors (and conference co-chairs) would like to acknowledge the significant contribution of Mrs Françoise Barkshire, at the University of Greenwich, who supported us admirably in processing all the papers published in this volume. The meeting was held at the Hilton San Diego Resort Hotel September 23-26, 2001 and was organised under the auspices of the TMS.

Given the growing importance of computational modeling in the analysis of materials, minerals and metals processes we trust that this is but the inaugural meeting of a regular and successful series.

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