

Preface

The continued development of advanced materials and processing requires understanding of the active diffusion mechanisms and the ability to model the diffusion-controlled phenomena within the materials and during processing. The papers in this edition of DDF were presented at the symposium entitled “Diffusion in Advanced Materials and Processing” that was held during the TMS 136th Annual Meeting and Exhibition (Orlando, FL, February 25 – March 1, 2007). The symposium focused on the identification and modeling of various diffusion mechanisms and phenomena in advance materials in structural, electronic and functional applications, as well as in processing techniques including deposition, solidification and heat treatment. Fundamental topics presented and discussed include diffusion in nanomaterials, interfaces, dislocations, metallic glasses, amorphous materials, oxides, metals and metallic alloys. Applications of diffusion in nuclear power generation, solidification, steel processing, and gas turbine materials-coatings were highlighted. Tools for education and training were also presented. Pervasive throughout the symposium and this edition of DDF is the mechanism-based models using phenomenological, atomistic, and first principles approaches. Organizers of the symposium and the guest editors of this DDF edition would like to thank authors, representing 12 different countries, who presented 51 talks at the symposium, published 18 manuscripts in this issue. The symposium was sponsored by ASM MSTCS Atomic Transport Committee, TMS Alloy Phase Committee, TMS High Temperature Materials Committee, TMS Solidification Committee and TMS Nuclear Materials Committee.