



# Materials Performance & Characterization

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## IN APPRECIATION

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The high quality of the papers that appear in this publication is a tribute not only to the obvious efforts of the authors represented but to the unheralded, though essential, efforts of their reviewers. It is to the reviewers dedication to upholding the high standards of their profession that this note pays tribute. On behalf of ASTM International and the authors as well, we acknowledge with appreciation their important contribution to the success of this journal.

# Overview

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## Special Issue on High Temperature Fatigue

High Temperature Fatigue is a topic of great significance in the aerospace, automotive, power generation, petrochemical, and metalworking industries, where safety and reliability are major driving factors for success. The durability of the machinery components that are used or produced by these industries is intimately related to their ability to sustain the cyclic loadings at high temperatures without failure. In addition to mechanically driven fatigue damage, a clear understanding of high temperature phenomena such as creep, surface oxidation, diffusion, and softening plays a key role in the design of new materials and structures that could better withstand fatigue at elevated temperatures. Like in all other areas of engineering, the current level of understanding of high temperature fatigue strongly relies on the synergy between experimental and computational methods. The latter has become increasingly important, particularly when attempting to simulate service conditions of full scale components which may be scaled-down to the experimental level for producing more meaningful results.

This Special Issue on High Temperature Fatigue presents some of the most recent scientific and technological advancements in thirteen peer-reviewed articles of leading experts from eight countries with four articles on creep-fatigue, three on thermomechanical fatigue, two on fatigue crack mechanics and one article each on fatigue at long term high temperature exposures, hot corrosion fatigue, modeling of non-isothermal fatigue and thermal fatigue. The materials covered in this special issue include: nickel-based superalloys, creep-resisting steels, stainless steels and tool steels.

We wish to thank everyone who made this MPC Special Issue possible: authors, reviewers, editors and publication staff for their efforts and continued support. We specially acknowledge Dr. George E. Totten for his valuable guidance and advice in planning and compiling this Special Issue.

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