Preface

The topical volume “Transfer Phenomena in Fluid and Heat Flows” of Defect and Diffusion Forum covers in a wider sense diffusion related phenomena. One of the most important challenges of modern society is the efficient, secure and sustainable generation and conversion of energy. This topics spans from the application of classical fossil fuels (e.g. oil and coal based) to natural gas and more alternative approaches which are based on bio fuels, solar energy and wave energy conversion. It should be not forgotten in this context that nuclear energy is still in many countries an important contributor in the global energy mix. Not only the resource itself (e.g. gas) but also the devices for the energy conversion or resourcing (for example engines, turbines, reactors or other devices) are in the focus of scientists and engineering around the globe. To deal with the related questions of efficiency or even save operation, a fundamental knowledge on thermal material properties, thermal states and their effects on other physical, for example mechanical, properties is essential. This requires a profound knowledge in the classical domain of experimental and numerical fluid mechanics and the adjacent fields or materials and mechanical engineering in a wider sense. In the same way important are the connected topics of reusing waste thermal energy as well as the opposite need of cooling. A further topic which requires a similar skill set and which is covered in this topical volume is related to the manufacturing (e.g. furnaces), modification (e.g. heat treatment) and processing (thermal cutting) of materials.

Finally we would like to thank all authors for their valuable contributions and all the reviewers, which made this volume possible.

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