Preface

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This issue reflects the outcome of the 1st International Workshop on Near-Wall Reactive Flows (NWRF) held in Seeheim (Germany, November 2010), which was organized jointly by the Center of Smart Interfaces (CSI) and the Collaborative Research Centre SFB568: “Flow and Combustion in Future Gas Turbine Combustion Chambers” of the Technische Universität Darmstadt.

The focus is on reporting the progress of experimental, theoretical and numerical techniques for describing and designing near wall reactive flows in diverse scientific and industrial fields. Advances in various engineering and process applications necessitate better understanding of underlying surface processes. High-temperature material synthesis and processing, engine heat transfer and combustion, chemical process technology (chemical vapor deposition and infiltration, catalytic processes, etc.) and spray combustion in confined environments are just a few familiar examples. Thereby processes, like surface reconstruction, material deposition, film growth and material etching, wall-flame interaction, surface reactions and their coupling with chemically reacting flows, are being addressed.

The workshop on NWRF aimed at providing an opportunity for researchers and interested workers to present the state-of-the-art, discuss new challenges and developments, and exchange innovative ideas. The contributions to this topic constitute the main part of this issue in which focus is especially put on diagnostics for near-wall reactive flows, modeling, numerical simulation and optimization using CFD, chemical technology and catalytic processes, and turbulent spray combustion. The kind support of CSI and SFB568 along with the DFG (Deutsche Forschungsgemeinschaft) to the organization of the 1st International Workshop on Near-Wall Reactive Flows (NWRF) is highly appreciated.

As surface reactions and their coupling with chemically reacting flows are encountered also in particle combustion and reaction, this issue also includes in its second

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part several contributions related to coal combustion and gasification. These papers originated from the First ERCOFTAC Conference on Simulation of Multiphase Flows in Gasification and Combustion held in Dresden (Germany, September 2011), and have been edited by the conference organizers C. Hasse (University of Freiberg, Germany) and D. Thevenin (University of Magdeburg, Germany). The financial support of ERCOFTAC is hereby acknowledged.