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NEAR WALL REACTIVE FLOWS: SIMULATION, MODELLING AND VALIDATION

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ABSTRACT

The presence of solid walls, encountered in many flow systems, strongly influences the flow, heat and mass transfer in the adjacent fluid layer; this is especially the case when phase changes and chemical reactions take place. Development of relevant computational methods (including both theoretical models and numerical approaches) and experimental techniques for model validation is fostered primarily by the demands of engineering practice and advances in various application systems, which necessitate better understanding of underlying multiscale and multiphysics near wall processes.

Besides, high-temperature material synthesis and processing, engine heat transfer and combustion, as well as chemical process technology (chemical vapour deposition and infiltration, catalytic processes, etc.), represent just a few representative examples. Accordingly, the processes like material deposition, film growth and material etching, surface reactions and their coupling with chemically reacting flows, wall-flame interaction - all together with the presence of conjugated processes of heat and mass transfer - have to be addressed.

This mini-symposium is intended to highlight some achievements accomplished within the relevant topicality. Since both the modeling approaches and validation measurements near the wall are challenging, the mini-symposium will help by providing the state of the art with respect to (a) reliable modelling approaches for the simulation of multiscale and multiphysics near-wall processes in combustion systems, (b) appropriate experimental data required for a comprehensive model validation, and (c) validation/uncertainty quantification issues for LES in near-wall regions. The mini-symposium will give to participants the possibility to present their most recent results while offering, in addition, an opportunity to develop and initiate new collaborations in this field.