Special issue of the joint research project !nnovA²

Andrea Luke¹

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This special issue is dedicated to the joint research project “Innovative equipment and plant concept for increased efficiency of production processes” – !nnovA² - initialized by “wanted technologies” of ProcessNet (Germany) and supported by the German Ministry for Education and Research (Bundesministerium für Bildung und Forschung) in the past. Five universities and several industrial partners cooperate to enhance the fundamental knowledge of two-phase heat transfer and to transfer them into calculation methods for practical application. The industry demand of consistent engineering data with defined boundary conditions for the design and operation of the apparatuses and processes of heat transfer with phase change is therefore achieved for the systems investigated. The efficiency and application of evaporators and condensers has increased since the last decades due to significant advances in experimental and theoretical understanding of the heat transfer with phase change and due to new manufacturing processes and material. Nevertheless, new enhancement technologies and their potential are not yet used in the industrial application because of the lack of valid engineering data.

All such activities coincide with the increasing need and demand of energy efficient systems e. g. for cooling or heat recovery to avoid climate change and to preserve the natural resources. The current special issue is devoted to some of the results of this joint research project completed by some recently published paper within this journal. The papers cover fol-

lowing topics: theoretical and experimental fundamentals in transport processes in condensation outside and inside of tubes with and without enhancement structures, heat transfer in falling film evaporation, in pool and flow boiling; condensation and evaporation in macro- and microscale; different enhancement methods by surface variation or by nanoparticles; application of condensers and evaporators in refrigeration and Organic Rankine Cycles.

The papers published in this special issue were preselected by the chairman of the joint research project, Prof. S. Scholl (Braunschweig, Germany), and were peer-reviewed for publication in Heat and Mass Transfer. These papers reflect a very good spectrum of topics of current interest in evaporation and condensation in a wide range and also in practical application. I would like to acknowledge the very good cooperation among the partners within the project, which lead to important results. This successful and effective joint research will be continued in the future.

Finally, I want to express special thanks to the authors for their contributions to this special issue, and the reviewers of the manuscripts for their invaluable input, responsiveness and for making the publication of this special issue possible.

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✉ Andrea Luke
luke@uni-kassel.de

¹ Fachgebiet Technische Thermodynamik, Universität Kassel, Kurt-Wolters-Str. 3, D-34125 Kassel, Germany