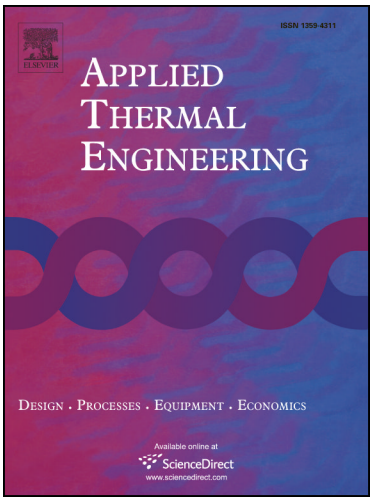

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Optimization of power density and metal-to-adsorbent weight ratio in coated adsorbers for adsorptive heat transformation applications

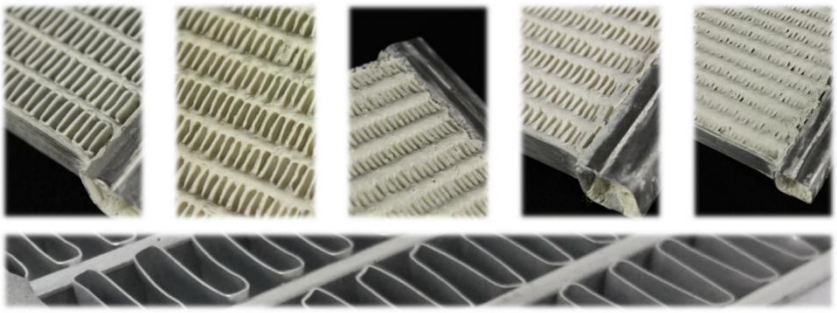
Phillip Bendix[a, b, *], Gerrit Füldner[a], Marc Möllers[a], Harry Kummer[a], Lena Schnabel[a], Stefan Henninger[a], Hans-Martin Henning[a, b]

[a] Division Thermal Systems and Buildings, Fraunhofer Institute for Solar Energy Systems ISE, Heidenhofstrasse 2, 79110 Freiburg, Germany

[b] Department of Mechanical Engineering, Karlsruhe Institute of Technology KIT, Kaiserstrasse 12, 76131 Karlsruhe, Germany

[*]corresponding author: e-mail address: phillip.bendix@ise.fraunhofer.de

Grafical Abstract



Highlights:

- Adsorptive coating with varying thickness - small and full scale
- Extensive characterization of adsorption dynamics
- Sustained high power for increased coating thickness

ABSTRACT:

Heat transformation systems such as gas adsorption heat pumps will be one cornerstone in reducing the carbon footprint of the building sector. Their development calls for an increase in power density without sacrificing energy efficiency. For the adsorber component this translates to small ratio of heat exchanger to adsorbent mass. Possibilities to achieve this have been investigated on small scale samples as well as on full scale adsorbers. Different samples and adsorbers with varying adsorbent to metal ratios where produced and characterized using the large pressure jump and large temperature jump method. Under certain conditions it could be shown that in small scale and full scale the power can be kept on a high level while increasing the adsorbent to metal ratio. Here the heat and mass transfer in the coating layer is not limiting the adsorber power.