Hamburg University of Technology (TUHH)
Institute of Thermal Separation Processes -V8-
Eissendorfer Str. 38, DE-21073 Hamburg

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Abstract Formulary

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Title: Kinetic studies on aerogel formation, ageing and ambient pressure drying using an analytical tool box

Authors: Charlotte Heinrich, René Tannert, Oleg Greyz, Oliver Peters, Seeni Meera Kamal Mohamed, Benjamin Ignatzi, and Barbara Milow

Presenting author: Marina Schwan

Institution (Presenter): German Aerospace Center (DLR), Cologne, Germany

ABSTRACT (Space limited to 2200 characters)

Consideration of economic and ecological aspects along the process chain of a new product is of enormous importance with regard to successful technology development and market launch. In order to reach global climate goals, emissions must be drastically reduced. In Germany, industrial processes are responsible for about 28% of the total energy consumption, emphasizing the need for saving energy in that area. Aerogels have the potential to replace conventional materials in a lot of applications and therefore, a high demand for their production is predicted. Hence, finding solutions also for energy-efficient production of this materials is of great importance. For the synthesis of some aerogels, the most energy-intensive process steps are the aging and drying of the gels in an oven. Reduction of the power consumption can be achieved by optimizing the dwell times and temperatures of the aerogels in these processes. To this end, it is necessary to investigate and understand the processes and kinetics of the individual synthesis steps in greater detail.

In this work, we show selected results of our analytical tool box for the kinetic analysis of sol-gel processes as well as ageing and drying processes under ambient pressure. The setup enables analyses to be carried out inside the heated reaction vessels. In addition, it is possible to investigate aliquots of the reaction mixtures offline by different methods. We present initial results of aerogel case studies using different analytical inline and atline methods.

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