

ORGANIC AEROGELS AS MONOLITHS AND PARTICLES: ON THE WAY FROM LABORATORY TO PRODUCTION SCALE

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Abstract

Aerogels represent a fascinating class of materials, combining extremely high porosity, large surface area and low density. This allows for many different applications, like insulating materials, carriers of active agents or gas sensors. The structural properties as well as the chemical behavior of aerogels can be tailored by the origin of the precursor used for the gelation. In this work different types of organic aerogels along with their actual and potential applications and synthesis are discussed. Special attention is given to the methods of up-scaling of the production process. One recently introduced industrial production process of polyurethane-based aerogels in form of plates is discussed in more details.

For many applications not a monolithic aerogel, but particles or beads of various size are required. However, the production of aerogel particles is still in its infancy, although both the production time and costs can be significantly reduced in comparison to monolithic form. Different strategies for particle generation, solvent exchange and supercritical drying will be represented. Those investigated in frame of the EU project Nanohybrids are presented in details.

In the last part, different post-processing strategies, like coating in a fluidized bed and functionalization in a fluid phase are presented.

Acknowledgement: This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 685648

