

# Polysaccharide Based Aerogels as Sustainable Absorbing Materials

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Polysaccharides are the most abundant organic molecules on Earth. Since ancient times they are used as renewable sources for several products. The polymeric hydrocarbon molecules are composed on repeated glucose units which are easy to be chemically modified. Already slight modifications can change the chemical and physical properties such as water resistance or water solubility, or the affinity towards other chemicals like gaseous pollutants.

The nano-structured open-porous nature of aerogels provide important benefit for adsorbing materials. They deal with adjustable properties like huge surface areas, pore size distributions and pore volumes which provide high efficiency.

For filtering applications aerogels in shape of beads are of advantage to maximize adsorption capacity, tailor gaseous flowrates and enable the necessary diffusivity on the other hand.

Our investigations on the synthesis recipes and processing parameters lead to great improvement. Cellulose itself can be used as a humidity regulating absorber and the presence of amine groups of chitosan-based aerogels show a remarkable potential for the absorbance of CO<sub>2</sub>. Further applications can be achieved for the adsorption of volatile organic compounds by suitable modifications. The field of possibilities seems to be endless.

Meanwhile an available technical process for jelly beads, using a jet-cutter® unit, is laboratory tested for the production of aerogel beads.

Within the presentation the chemical synthesis and the preparation of various polysaccharide aerogels will be explained. In addition beads shaping techniques from lab scale to technical production will be discussed. Results on the characterization of the received beads, their morphology and physical as well as chemical properties will be shown. The determinations of the adsorption and desorption of selected gases will be evaluated to show its possibility to regenerate. The potential on aerogel beads for sustainable absorbing applications will be considered.

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