

Influence of processing conditions on chitosan aerogel structure and properties

Coraline Chartier, Sytze Buwalda, Tatiana Budtova

MINES ParisTech, PSL Research University, Center for Materials Forming (CEMEF), UMR CNRS 7635, CS 10207, 06904 Sophia Antipolis, France

Presenting author E-mail address: coraline.chartier@mines-paristech.fr (C. Chartier)

The high specific surface area and the possibility of controlling the porosity of chitosan aerogels combined with their biocompatibility, their antibacterial and antifungal properties are very attractive in biomedical applications as tissue engineering, wound healing or controlled drug release. In this study we aim to broaden the current understanding of the influence of processing conditions on chitosan aerogel properties.

Highly porous and nanostructured chitosan aerogels were prepared via dissolution, non-solvent induced phase separation, solvent exchange and drying with supercritical CO₂. Chitosan concentration, nature of the solvent, nature and composition of the coagulation bath were varied. The results showed that chitosan concentration in solution and the composition of the coagulation bath are the main parameters tuning samples' shrinking during processing and also specific surface area, the latter varied from 250 to 450 m²/g. SEM observations showed the presence of macropores and mesopores; bulk density varied from 0.06 to 0.26 g/cm³. This study shows the pathways of preparing chitosan aerogels with tunable properties.

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