

Zircon Oxide Aerogels Prepared by the Epoxy-Route and Supercritical Drying

Motivation

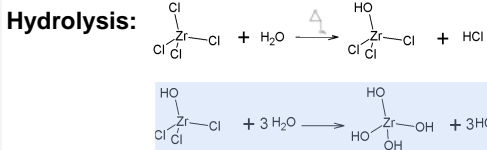
Availability of granular ZrO_2 aerogel for industrial applications.
 Searching for synthesis routes for industrial production of ZrO_2 aerogel.

- simple and fast process
- available chemicals
- low energy consumption
- stable processing window for upscaling

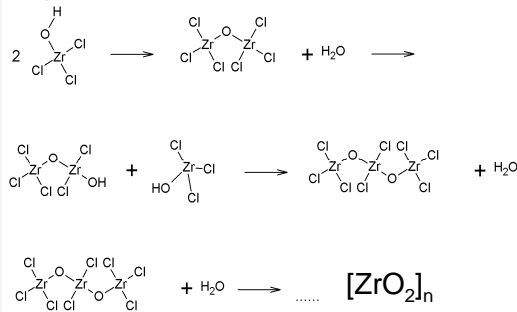
Synthesis

Synthesis of the 3D-network of ZrO_2 aerogel via Sol-Gel processes with two types of precursor:

Precursor: $ZrCl_4$ – Catalyst: Propylenoxid

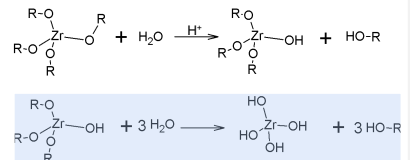


Polycondensation:

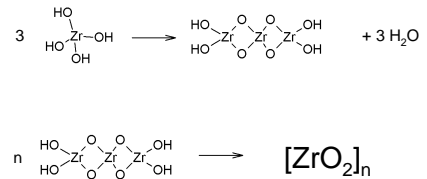


Precursor: $Zr(OR)_4$ – Catalyst: HNO_3 , Acetic acid

Hydrolysis:

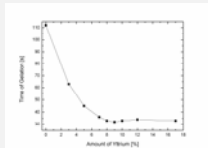
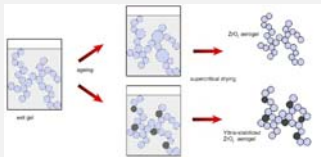


Polycondensation:

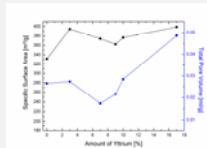


Characterization and Results

Modification by Yttria:



Influence of the amount of Yttria on the time of gelation.

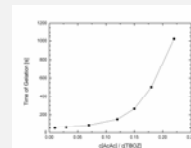
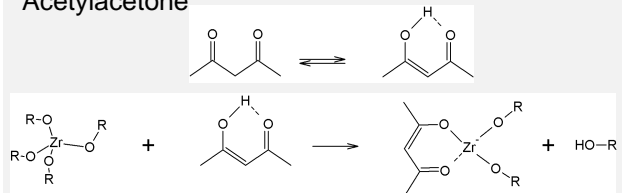


Dependence of the amount of Yttria on the specific surface and the total pore volume.

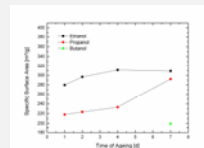
All aerogels are dried by supercritical CO_2 extraction



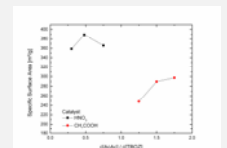
Modification by chelate-complexation with Acetylacetonone:



Influence of the amount of acetylacetonone (AcAc) on gelation time.



Influence of ageing time on the specific surface area.



Influence of the catalyst used on the specific surface area.