Claims:

1. Method for producing a silica aerogel by means of a sol-gel process, wherein first a lyogel is produced from a sol and subsequently the lyogel is converted into an aerogel,

characterized in that

the production of the lyogel is carried out at least partially at a pressure of more than 30 bar

in a process medium under pressure in the form of a compressed gas or a supercritical substance or mixture of substances,

wherein the sol is introduced into a pressurized apparatus in the form of droplets, and

wherein the gel formation is initiated by a pH shift due to the drying gas or process medium used.

~~2. Method according to claim 1, characterized in that the production of the lyogel is carried out in a compressed gas or a supercritical substance or mixture of substances.~~

~~3~~2. Method according to claim 1 ~~or 2~~, characterized in that

the pressure is more than 40 bar, in particular more than 50 bar, preferably more than 60 bar, more preferably more than 70 bar, particularly preferably more than 74 bar, and/or

in that the production of the lyogel is carried out at temperatures above 50°C, in particular 60 °C, preferably 70 °C, more preferably 80 °C.

43. Method according to ~~any one of claims 1 to 3~~claim 1 or 2, characterized in that the conversion of the lyogel into an aerogel is carried out at a pressure of more than 50 bar.

54. Method according to any one of the preceding claims, characterized in that the sol is a solution or a dispersion of a precursor.

65. Method according to claim ~~5~~4, characterized in that the precursor is selected from silicic acids, in particular colloidal silicic acid, colloidal silica, silanes, silica sols, preferably tetraalkoxysilanes, siloxanes and mixtures thereof.

~~7. Method according to any one of the preceding claims, characterized in that the sol comprises a hydrophobing agent, in particular a silanizing agent.~~

86. Method according to any one of the preceding claims, characterized in that the sol is ~~introduced, in particular~~ is dripped and/or sprayed~~,~~ into a pressurized apparatus in the form of droplets.

97. Method according to any one of the preceding claims, characterized in that after the production of the lyogel a solvent exchange is performed.

~~10. Method according to claim 9, characterized in that the solvent exchange, in particular a bringing into contact of the lyogel with an organic solvent, is performed at elevated pressure.~~

~~11. Method according to claim 10, characterized in that the organic solvent is brought into contact with the lyogel together with a hydrophobing agent, in particular a silanizing agent.~~

~~12. Method according to claim 11, characterized in that subsequent to solvent exchange and/or hydrophobing of the lyogel, in particular subsequent to method step (c), the lyogel is converted into an aerogel.~~

~~13~~8. Aerogel, in particular obtainable according to one of the preceding claims, characterized in that the aerogel is provided in the form of particles having an in particular at

least substantially circular cross-section, and that the aerogel comprises particle sizes in the range of from 0.1 to 10 mm.

~~14~~9. Aerogel according to claim ~~13~~8, characterized in that the aerogel particles are spherical or cylindrical.

~~15~~10. Aerogel according to claim ~~13~~ 8 or ~~14~~9, characterized in that the aerogel comprises particle sizes in the range of from ~~0.1 to 10 mm, in particular from~~ 0.2 to 8 mm, preferably from 0.3 to 7 mm, more preferably from 0.5 to 5 mm.

~~16~~11. Use of an aerogel according to any one of claims ~~13~~ 8 to ~~15~~ 10 for insulation purposes, in particular for sound insulation, electrical insulation or thermal insulation, in particular for heat insulation, or as a carrier material, as an absorption agent or as an adsorption agent.

~~17~~12. Use of an aerogel according to any one of claims ~~13~~ 8 to ~~15~~ 10 for insulating purposes, in particular as or in heat insulations.

~~18. Apparatus (1) for producing an aerogel at pressure,~~

~~**characterized in that**~~

~~the apparatus (1) comprises~~

~~(a) at least one reactor (2) which can be pressurized,~~

~~(b) at least one inlet opening (3) arranged at the reactor (2), in particular a nozzle, for introducing fluids, in particular liquids, into the reactor, and~~

~~(c) at least one outlet opening (4) arranged at the reactor (2), in particular a sluice, for removing liquids or solids from the reactor.~~

~~19~~13. Method for producing a silica lyogel by means of a sol-gel process,

characterized in that

the production of the lyogel is carried out at least partially at a pressure of more than 30 bar

in a process medium under pressure in the form of a compressed gas or a supercritical substance or mixture of substances,

wherein the sol is introduced into a pressurized apparatus in the form of droplets, and

wherein the gel formation is initiated by a pH shift due to the drying gas or process medium used.