Claims

1. A polysaccharide based aerogel comprising a network of polysaccharide fibers with pores therebetween, wherein the sizes of the pores are in the micrometer range of about 1 µm to about 1000 µm, and wherein said polysaccharide is obtained from a recyclable material.

2. The aerogel of claim 1, wherein the pore sizes are more than 20 μm.

3. The aerogel of claim 2, wherein the pore sizes are in the range of about 20 to about 50 μm, about 50 to about 1000 μm, about 30 to about 250 μm or about 40 to about 200 μm.

4. The aerogel of any one of the preceding claims, wherein the diameters of the cellulose fibers are in the range of about 5 to about 100 μm or about 8 to about 50 μm.

5. The aerogel of any one of the preceding claims, wherein said aerogel has a porosity in the range of 94% to 98%.

6. The aerogel of any one of the preceding claims, wherein the thermal conductivity of said aerogel is in the range of 0.02 to 0.04 $Wm^{-1}K^{-1}$.

7. The aerogel of any one of the preceding claims, wherein said aerogel is coated with a hydrophobic agent.

8. The aerogel of any one of the preceding claims, wherein said polysaccharide fibers are functionalized with a silane compound.

9. The aerogel of claim 8, wherein said silane compound

comprises at least one functional group selected from the group consisting of alkenyl, alkyl, alkoxy,

benzyl, acryloxy, amino, ureide, sulfide, isocyanurate, mercapto and isocyanate.

10. The aerogel of any one of the preceding claims, wherein said polysaccharide is selected from the group consisting of cellulose, lignin, hemicellulose, chitin, arabinoxylan and pectin.

11. The aerogel of any one of the preceding claims, wherein said polysaccharide fibers are bonded to each other via hydrogen bonding.

~~12. The aerogel of any one of the preceding claims, wherein said polysaccharide is obtained from a recyclable material.~~

12~~13~~. A method for forming a polysaccharide based aerogel comprising the steps of:

a. dissolving polysaccharide fibers from a recyclable material in a polysaccharide solvent in the presence of sound energy to form a polysaccharide dispersion; and

b. forming said polysaccharide dispersion into said aerogel.

13~~14~~. The method of claim 12, wherein step (b) comprises the steps of:

c. forming said polysaccharide dispersion into a gel; and

d. drying said polysaccharide gel to form said aerogel .

14~~15~~. The method of claim 13, wherein said drying step (d) comprises freeze-drying or supercritical drying.

15~~16~~. The method of any one of claims 12 to 14, wherein said polysaccharide solvent is an aqueous solution of alkali with urea or thiourea.

16~~17~~. A method for forming a hydrophobic polysaccharide based aerogel comprising the steps of:

a. dissolving polysaccharide fibers from a recyclable material in a polysaccharide solvent in the presence of sound energy to form a polysaccharide dispersion;

b. forming said polysaccharide dispersion into said aerogel; and

c. coating said aerogel with a hydrophobic agent.

17~~18~~. The method of claim 16, wherein said coating step comprises spraying said aerogel with said hydrophobic agent~~-~~.

18~~19~~. The method of claim 16, wherein said coating step comprises the step of applying said hydrophobic agent by gas phase chemical vapour deposition.

19~~20~~. The method of any one of claims 16 to 18, further comprising the step of removing excess hydrophobic agent from said coated hydrophobic aerogel.

20~~21~~. A reusable absorbent comprising a polysaccharide based aerogel having a network of polysaccharide fibers with pores therebetween, wherein the sizes of the pores are in the micrometer range of about 1 µm to about 1000 µm, and wherein said polysaccharide is obtained from a recyclable material.

21~~22~~. The absorbent of claim 20, wherein the absorbance capacity of said absorbent for a liquid is up to 25 times the weight of said

absorbent.

2223. The absorbent of claim 21, wherein said liquid is a polar liquid or non-polar liquid.

2324. The absorbent of any one of claims 20 to 22, wherein said absorbent is reusable for at least three times.

2425. The absorbent of claim 23, wherein any absorbed liquid therein is removed by exerting a pressure on said absorbent, thereby allowing said absorbent to be reused.

2526. Use of a polysaccharide based aerogel having a network of polysaccharide fibers with pores therebetween, for absorbing a non polar liquid, wherein the sizes of the pores are in the micrometer range of about 1 µm to about 1000 µm, and wherein said polysaccharide is obtained from a recyclable material ~~for absorbing a non-polar liquid~~.