Claims:

1. A water filter comprising:

a filter membrane comprising

a support membrane having a surface; and

a hybrid material on a surface of the support material, wherein the hybrid material comprises amyloid fibrils and the nanoparticulate ZrO_2, wherein the amyloid fibrils and the nanoparticulate ZrO_2 are in intimate contact, remain separate and distinct and are thoroughly and randomly mixed; and wherein the nanoparticulate ZrO_2 is below 50 nm size.

2. The water filter of claim 1, wherein the nanoparticulate ZrO_2 is below 10 nm size.

3. The water filter of claim 2, wherein

the ratio of amyloid fibrils to nanoparticulate ZrO_2 is in the range of 1 / 0.1 to 1 /300 (w/w).

4. The water filter of claim 3, wherein the amyloid fibrils are selected from fibrils being $\leq$ 10 nm in radius and $\geq$ 0.5μm in length; the amyloid fibrils show electrophoretic mobilities of the order 2 μm·cm/V·s at pH 4 as determined according to zeta-potential measurement; and the nanoparticulate ZrO_2 has a particle size below 10 nm and wherein the ratio of amyloid fibrils to nanoparticulate ZrO_2 is in the range of from 1/1 to 1/100 (w/w).

5. A water filter comprising:

a filter membrane comprising a material comprising amyloid fibrils and nanoparticulate ZrO_2; wherein the amyloid fibrils and the nanoparticulate ZrO_2 remain separate and distinct and are randomly mixed with one another; the nanoparticulate ZrO_2 is 10 nm in size or less; wherein the ratio of amyloid fibrils to nanoparticulate ZrO_2 is in the range of from 1/1 or 1/100 (w/w); and

a support material.

6. The water filter of claim 5, wherein the amyloid fibrils are selected from fibrils being ≤ 10 nm in radius and ≥ 0.5μm in length; the amyloid fibrils show electrophoretic mobilities of the order 2 μm·cm/V·s at pH 4 as determined according to zeta-potential measurement.

7. A water filter for filtering fluoride comprising amyloid fibrils, nanoparticulate ZrO2 confined to the amyloid fibrils, and a support material; wherein the amyloid fibrils and the nanoparticulate ZrO_2 remain separate and distinct and are randomly mixed with one another; the nanoparticulate ZrO_2 is below 50 nm size; wherein the ratio of amyloid fibrils to nanoparticulate ZrO_2 is in the range of from 1/1 or 1/100 (w/w).

8. The water filter for filtering fluoride of claim 7, wherein the amyloid fibrils are selected from fibrils being ≤ 10 nm in radius and ≥ 0.5μm in length; the amyloid fibrils show electrophoretic mobilities of the order 2 μm·cm/V·s at pH 4 as determined according to zeta-potential measurement; and the nanoparticulate ZrO_2 has a particle size below 10 nm.

9. The water filter for filtering fluoride of claim 7, wherein the nanoparticulate ZrO_2 and the amyloid fibrils form a hybrid material, and the hybrid material is located on a surface of the support material.

10. The water filter for filtering fluoride of claim 9, wherein the support material is a porous material.

11. The water filter for filtering fluoride of claim 10, wherein the porous material is activated carbon.

12. The water filter for filtering fluoride of claim 9, wherein the nanoparticulate ZrO_2 is obtained in situ.

13. The water filter for filtering fluoride of claim 8, wherein the material is either the hybrid material disposed on the support material as a layer, or the hybrid material is disposed on the support material in a particulate form.

14. The water filter for filtering fluoride of claim 8 further comprising a binder material chosen from the group consisting of cellulose pulp and a polymer material, and the binding material engages the support material to the nanoparticulate ZrO_2 and amyloid fibrils.

15. The water filter for filtering fluoride of claim 7, wherein the material removes 99.2% or above of fluoride from both (a) contaminated waters with fluoride concentrations below 10 ppm and (b) contaminated waters with fluoride concentrations above 50 ppm.

16. The water filter for filtering fluoride of claim 5 wherein the nanoparticulate ZrO_2 and the amyloid fibrils form a hybrid material, and the hybrid material is located on a surface of the support material.

17. The water filter for filtering fluoride of claim 16, wherein the material is either the hybrid material disposed on the support material as a layer, or the hybrid material is disposed on the support material in a particulate form.

18. The water filter for filtering fluoride of claim 17, wherein the support material is porous and is made up of activated carbon.

19. The water filter of claim 1, wherein the support material is a porous material.

20. The water filter of claim 19, wherein the porous material consists of activated carbon.