

Claims

1. A composite membrane comprising:
 - a porous polyvinylidene fluoride (PVDF), polytetrafluoroethylene (PTFE) or
5 nitrocellulose membrane body; and
 - graphene oxide disposed on a surface of the membrane body.
2. The composite membrane according to claim 1, wherein at least a portion of the
graphene oxide is bound to the membrane body via a crosslinking agent.
- 10 3. The composite membrane according to claim 1 or claim 2, wherein at least a
portion of the graphene oxide is covalently bound to the membrane body via a crosslinking
agent.
- 15 4. The composite membrane according to claim 2 or claim 3, wherein the crosslinking
agent is selected from 1,5-pentanediol, glutaraldehyde and glycol.
5. The composite membrane according to any one of claims 1 to 3, wherein the
graphene oxide is in the form of a layer.
- 20 6. The composite membrane according to claim 5, wherein the layer is a substantially
continuous layer coating a surface of the membrane body.
7. The composite membrane according to any one of claims 1 to 6, wherein the
25 graphene oxide has a C/O ratio in the range of from about 2.1 to about 4.5.
8. The composite membrane according to any one of claims 1 to 7, wherein the
porous membrane body is a porous polyvinylidene fluoride (PVDF) membrane body.
- 30 9. The composite membrane according to any one of claims 1 to 8, wherein the
composite membrane is in the form of a hollow fiber composite membrane.

10. The composite membrane according to claim 9, wherein the graphene oxide is disposed on an outer surface of the hollow fiber membrane.

11. An array comprising two or more composite membranes according to any one of
5 claims 1 to 10, the two or more composite membranes arranged in parallel in the array.

12. A method of preparing a composite membrane, the method comprising:

(a) providing a porous polyvinylidene fluoride (PVDF), polytetrafluoroethylene (PTFE) or nitrocellulose membrane body; and

10 (b) filtering a dispersion comprising graphene oxide through the membrane body such that the continuous phase of the dispersion passes through a surface of the membrane body, thereby depositing graphene oxide on the surface of the membrane body.

13. The method according to claim 12, wherein the continuous phase of the dispersion
15 comprising graphene oxide comprises at least 50 %v/v ethanol.

14. The method according to claim 12 or claim 13, wherein the method further comprises an additional step, step (a1), before step (b), in which the porous membrane body is treated with a solvent to remove, completely or at least partially, any protective
20 coating that may be present on the membrane body.

15. The method according to any one of claims 12 to 14, wherein the method further comprises an additional step, step (a2), after step (a), or step (a1) when included, and before step (b), in which the porous membrane body is contacted with a crosslinking agent.
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16. A composite membrane prepared by the method according to any one of claims 12 to 15.

17. A method of removing NOM from NOM-contaminated water, or water suspected
30 of being contaminated with NOM, the method comprising passing the NOM-contaminated water, or water suspected of being contaminated with NOM, through a composite membrane according to any one of claims 1 to 10 or 16, or an array according to claim 11.