**[0009]** Also disclosed herein is a method of preparing a composite membrane, the method comprising:

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

(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.

**[0009a]** In another aspect, there is provided a method of preparing a composite membrane, the method comprising:

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

(a1) optionally treating the porous membrane body with a solvent to remove, completely or at least partially, any protective coating that may be present on the membrane body;

(a2) contacting the porous membrane body with a crosslinking agent; and

(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.

**[0010]** In some examples, the continuous phase of the dispersion comprising graphene oxide comprises at least 50 %v/v ethanol. In some examples, 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 coating that may be present on the membrane body. In some examples, 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.

**[0011]** In another example, this disclosure also provides a composite membrane prepared by the method as set forth herein.

**[0012]** In another aspect, also disclosed herein is a method of removing NOM from NOM-contaminated water, or water suspected 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 as set forth herein, a composite membrane prepared by the method as set forth herein or an array as set forth herein.

**Claims:**

1. A composite membrane comprising:

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

- graphene oxide disposed on a surface of the membrane body;

and wherein at least a portion of the graphene oxide is covalently bound to the membrane body via a crosslinking agent.

2. The composite membrane according to claim 1, wherein the crosslinking agent is a $C_{2-20}$ linear or branched alkyl, alkenyl or alkynyl group substituted towards one end with a functional group capable of bonding covalently to PVDF, PTFE or nitrocellulose, and substituted towards another end with a functional group capable of bonding covalently to graphene oxide.

3. The composite membrane according to claim 1 or claim 2, wherein the crosslinking agent is a linear $C_{2-6}$ alkyl group substituted towards a first end with a first functional group capable of bonding covalently to PVDF, PTFE or nitrocellulose, and substituted towards a second end with a second functional group capable of bonding to graphene oxide, preferably the crosslinking agent has a first functional group selected from -OH, -CHO and -COOH and a second functional group selected from -OH, -CHO and -COOH.

4. The composite membrane according to any one of claims 1 to 3, wherein the crosslinking agent is a diol, dialdehyde or diacid.

5. The composite membrane according to any one of claims 1 to 4, wherein the crosslinking agent is selected from 1,6-hexanediol, 1,5-pentanediol, 1,4-butanediol, 1,3-propanediol, 1,2-propanediol (propylene glycol), 1,2-ethanediol (glycol) and glutaraldehyde (1,5-pentanedial), preferably the crosslinking agent is selected from 1,5-pentanediol, glutaraldehyde and glycol.

6. The composite membrane according to any one of claims 1 to 5, wherein the graphene oxide is in the form of a layer.

7. The composite membrane according to claim 6, wherein the layer is a substantially continuous layer coating a surface of the membrane body.

8. The composite membrane according to any one of claims 1 to 7, wherein the graphene oxide has a C/O ratio in the range of from about 2.1 to about 4.5.

9. The composite membrane according to any one of claims 1 to 8, wherein the porous membrane body is a porous polyvinylidene fluoride (PVDF) membrane body.

10. The composite membrane according to any one of claims 1 to 9, wherein the composite membrane is in the form of a hollow fiber composite membrane, or a flat composite membrane.

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

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

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

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

(a1) optionally treating the porous membrane body with a solvent to remove, completely or at least partially, any protective coating that may be present on the membrane body;

(a2) contacting the porous membrane body with a crosslinking agent; and

(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.

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

15. A method of removing NOM from NOM-contaminated water, or water potentially contaminated with NOM, the method comprising passing the NOM-contaminated water, or the water potentially contaminated with NOM, through a composite membrane according to any one of claims 1 to 11, or an array according to claim 12.