CLAIMS:

1. A reverse osmosis method for reducing boron concentration in water containing boron, said reverse osmosis method comprising contacting the water with a composite membrane comprising moieties derived from an aromatic sulfonyl halide, a heteroaromatic sulfonyl halide, a sulfinyl halide; a sulfenyl halide; a sulfuryl halide; a phosphoryl halide; a phosphonyl halide; a phosphinyl halide; a thiophosphoryl halide; a thiophosphonyl halide, an isocyanate, a urea, a cyanate, an aromatic carbonyl halide, an epoxide or a mixture thereof.

2. A reverse osmosis method according to claim 1, wherein the moieties are derived from an aromatic sulfonyl halide.

3. A reverse osmosis method according to claim 1, wherein the moieties are derived from 4-nitrobenzenesulfonyl chloride.

4. A reverse osmosis method according to claim 1, wherein the moieties are derived from 1,3-benzenedisulfonyl chloride.

5. A reverse osmosis method according to claim 1, wherein the moieties are derived from 4-cyano benzenesulfonyl chloride.

6. A reverse osmosis method according to claim 1, wherein the composite membrane additionally comprises a cross-linked hydrophilic polymer.

7. A reverse osmosis method according to claim 6, wherein the cross-linked hydrophilic polymer is polyvinyl alcohol.

8. A method for preparing a composite membrane comprising contacting under interfacial polymerization conditions an organic solution comprising a polyacid halide with an aqueous solution comprising a polyamine to form a polyamide membrane, said contacting being carried out on a surface of a porous base membrane, said organic solution further comprising an aryl sulfonyl halide.

9. A method according to claim 8, wherein the organic solution additionally comprises a C_3-C_8 cyclic carbonyl compound.

10. A method according to claim 9, wherein the C_3-C_8 cyclic carbonyl compound is cyclohexanone.

11. . A method according to claim 8, additionally comprising contacting the polyamide membrane with an oxidizing solution, such as sodium hypochlorite.

12. . A method according to claim 11, wherein the concentration of free chlorine in the sodium hypochlorite solution ranges from about 10 ppm to about 4000 ppm.

13. . A method according to claim 8, wherein the aryl sulfonyl halide is present in an amount ranging from about 0.01% to about 2% by weight.

14. . A method according to claim 8, wherein the aryl sulfonyl halide is 1,3-benzenedisulfonyl chloride or1,3,6-naphthalenetrisulfonyl chloride

15. A composite membrane prepared by the method of claim 8.

16. A reverse osmosis method for reducing boron concentration in water containing boron, said reverse osmosis method comprising contacting the water with a composite membrane comprising moieties derived from an aromatic sulfonyl halide, a heteroaromatic sulfonyl halide, a sulfinyl halide; a sulfenyl halide; a sulfuryl halide; a phosphoryl halide; a phosphonyl halide; a phosphinyl halide; a thiophosphoryl halide; a thiophosphonyl halide, an isocyanate, a urea, a cyanate, an aromatic carbonyl halide, an epoxide or a mixture thereof,

wherein the composite membrane is prepared by contacting under interfacial polymerization conditions an organic solution comprising a polyacid halide with an aqueous solution comprising a polyamine to form a polyamide membrane and contacting the polyamide membrane with an oxidizing solution;

said contacting being carried out on a surface of a porous base membrane,

said organic solution further comprising a C_3-C_8 cyclic carbonyl compound and an aryl sulfonyl halide.

17. A reverse osmosis method according to claim 16, wherein the oxidizing solution is a sodium hypochlorite solution.

Claims

1. A method for preparing a composite polyamide membrane comprising

contacting under interfacial polymerization conditions an organic solution comprising trimesoyl chloride with an aqueous solution comprising phenylene diamine to form a composite polyamide membrane, said contacting being carried out on a surface of a porous base membrane, said organic solution further comprising cyclohexanone and an aryl sulfonyl halide selected from 1,3-benzenedisulfonyl chloride and 1,3,6-naphthalenetrisulfonyl chloride; and

concentration of the aryl sulfonyl halide in the aqueous solution ranging from about 0.18% to about 0.71% by weight; and

contacting the composite polyamide membrane with a sodium hypochlorite solution to form a treated composite polyamide membrane having salt passage less than or equal to 1.26% and A-value greater than or equal to 16.5.

2. A method according to claim 1, wherein the concentration of free chlorine in the sodium hypochlorite solution ranges from about 10 ppm to about 4000 ppm.

3. A method according to claim 1, wherein the aryl sulfonyl halide is 1,3,6-naphthalenetrisulfonyl chloride.

4. A method according to claim 1, wherein the aryl sulfonyl halide is 1,3-benzenedisulfonyl chloride.

5. A composite membrane prepared by the method of claim 1.