CLAIMS

1. A method of making a forward osmosis membrane, comprising:

providing a support structure comprising a bilayer substrate including ~~at least a~~ first ~~layer~~ and ~~a~~ second separable layers;

applying a material to ~~the~~ first layer of the bilayer substrate of the support structure to form a membrane support layer;

applying a barrier material to the membrane support layer to form the forward osmosis membrane; and

releasing the forward osmosis membrane by separating the first layer of the bilayer substrate~~support structure~~ from the second layer of the bilayer substrate~~support structure~~.

~~2. The method of claim 1, wherein the support structure comprises a bilayer structure.~~

2~~3~~. The method of claim 1, wherein the first layer of the bilayer substrate~~support structure~~ has a Frazier air permeability of greater than about 50 cfm/ft$^2$-min and a thickness of less than 2 mils.

3~~4~~. The method of claim 1, wherein the material applied to the first layer of the bilayer substrate comprises a polymer loading ~~support structure is applied in a coating~~ of between about 5 and 20 g/m$^2$.

4. The method of claim 1, wherein the support layer has an overall thickness of less than 50 microns.

5. The method of claim 1, wherein the barrier material comprises a semipermeable material.

6. The method of claim 5, wherein the barrier material comprises a polymer.

7. The method of claim 6, wherein the barrier material comprises a polyamide urea, polypiperazine, or a block co-polymer.

8. The method of claim 1, wherein the bilayer substrate~~support structure~~ comprises a polymeric paper.

9. The method of claim 8, wherein the bilayer substrate~~support structure~~ comprises polyethylene terephthalate ~~PET~~ or polypropylene.

10. The method of claim 1, further comprising rewetting the forward osmosis membrane.

11. The method of claim 1, further comprising adding an additive to one or more layers of the membrane.

~~12. The method of claim 1, wherein the step of releasing the forward osmosis membrane by separating the first and second layers of the support structure comprises modifying a pore structure in at least a section of the forward osmosis membrane.~~

12. The method of claim 1, wherein the step of separating the first layer of the bilayer substrate from the second layer of the bilayer substrate comprises modifying a pore structure in the support layer.

13. The method of claim 1, further comprising reusing the second layer of the bilayer substrate.

14. A method of making a forward osmosis membrane, comprising:

providing a support structure comprising a bilayer substrate including first and second separable layers;

applying a material to the first layer of the bilayer substrate to form a membrane support layer, such that the material penetrates at least a portion of the first layer of the bilayer substrate and only partially penetrates the second layer of the bilayer substrate;

applying a barrier material to the membrane support layer to form the forward osmosis membrane;

releasing the forward osmosis membrane by separating the first layer of the bilayer substrate from the second layer of the bilayer substrate; and

modifying a pore structure of the support layer.

15. A method of making a forward osmosis membrane, comprising:

providing a support structure comprising a bilayer substrate including first and second separable layers, wherein the first layer has a Frazier air permeability of greater than 100 cfm/$ft^2$-min;

applying a material to the first layer of the bilayer substrate to form a membrane support layer;

applying a barrier material to the membrane support layer to form the forward osmosis membrane; and

releasing the forward osmosis membrane by separating the first layer of the bilayer substrate from the second layer of the bilayer substrate.

~~13. A method of making a forward osmosis membrane, comprising:~~

~~casting a paperless support structure on a fabrication belt or drum;~~

~~depositing a barrier material on the paperless support structure; and~~

~~delaminating the paperless support structure from the fabrication belt to form the forward osmosis membrane.~~

~~14. The method of claim 13, wherein the belt or drum is constructed and arranged to provide a surface which retains a portion of the support structure.~~

16~~15~~. A method of facilitating an osmotically driven separation process, comprising:

providing a forward osmosis membrane, wherein the step of providing the forward osmosis membrane comprises:

providing a support structure comprising a bilayer substrate including ~~at~~

~~least a~~ first ~~layer~~ and ~~a~~ second separable layers;

applying a material to the~~a~~ first layer of the bilayer substrate of the support structure to form a membrane support layer;

applying a barrier material to the membrane support layer to form the forward osmosis membrane; and

releasing the forward osmosis membrane by separating the first layer of the bilayer substrate~~support structure~~ from the second layer of the bilayer substrate~~support structure~~;

introducing a source of a draw solution to a first side of the ~~high performance~~ membrane; and

introducing a source of a feed solution to a second side of the ~~high performance~~ membrane.

17. A method of making a forward osmosis membrane, comprising:

casting a paperless support structure on a fabrication belt or drum;

depositing a barrier material on the paperless support structure; and

delaminating the paperless support structure from the fabrication belt to form the forward osmosis membrane.

18. The method of claim 17, wherein the belt or drum is constructed and arranged to provide a surface which retains a portion of the support structure.

19. The method of claim 17, wherein retained support structure is removed prior to full rotation of the belt or drum.