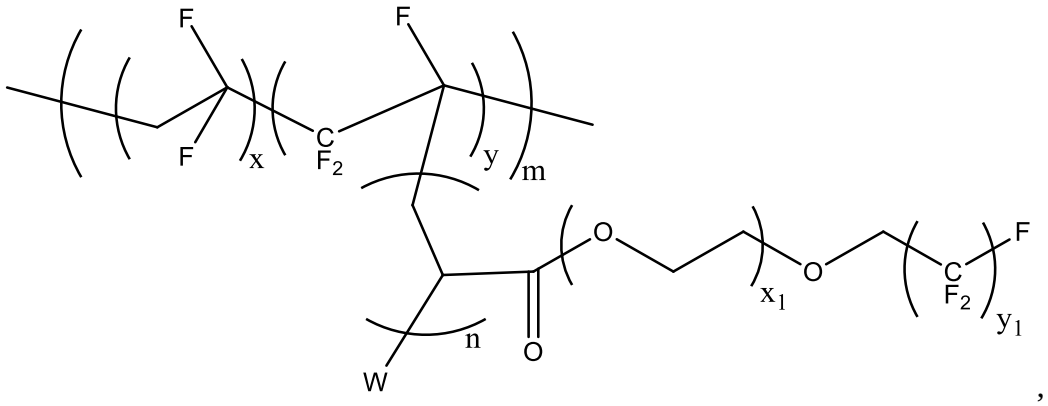
WHAT IS CLAIMED IS:

1. A polymer of the following formula:



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wherein W is a halogen, m is 10 to 1000, n is 1 to 1000, x is 50 to 1000, y is 1 to 200, x_1 is 1 to 100, and y_1 is 1 to 100.

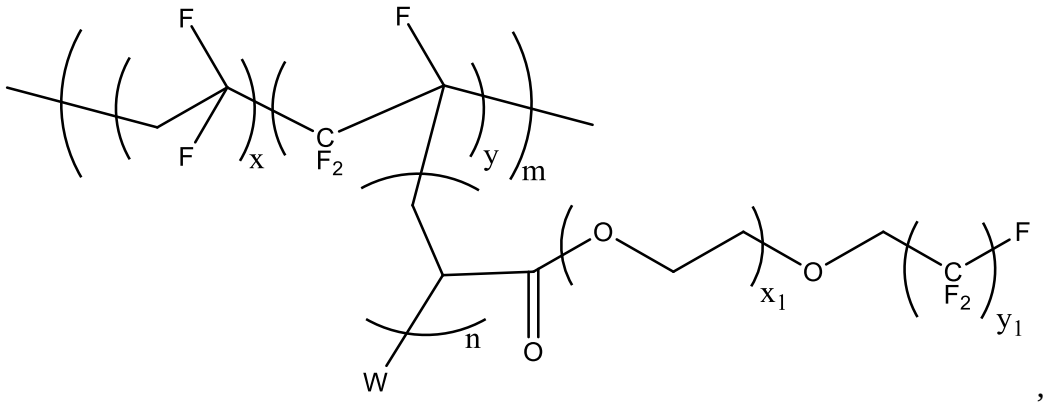
2. The polymer of claim 1, wherein m is 10 to 500, n is 5 to 500, x is 50 to 500, y is 1 to 100, x_1 is 5 to 50, and y_1 is 5 to 50.

3. The polymer of claim 2, wherein m is 10 to 20, n is 5 to 10, x is 90 to 100, y is 5 to 10, x_1 is 5 to 10, and y_1 is 5 to 10.

4. A polymeric membrane for separating oil from water, the polymer membrane comprising:

a matrix polymer that is hydrophobic, and

a functional polymer that contains a hydrophobic backbone and side chains, the side chains each having an oleophobic terminal segment and a hydrophilic internal segment, the functional polymer being of the following formula:



,

in which W is a halogen, m is 10 to 1000, n is 1 to 1000, x is 50 to 1000, y is 1 to 200, x_1 is 1 to 100, and y_1 is 1 to 100,

wherein the polymeric membrane has a pore size of 0.005 μm to 5 μm, a thickness of 50 μm to 1,000 μm, a water contact angle of 0º to 60º, an oil contact angle of 40º to 100º, and a weight ratio of the matrix polymer to the functional polymer of 99:1 to 1:9.

5. The polymer membrane of claim 4, wherein the polymer membrane has a pore size of 0.05 μm to 0.5 μm, a thickness of 100 μm to 500 μm, a water contact angle of 5º to 55º, an oil contact angle of 40º to 95º, and a weight ratio of the matrix polymer to the functional polymer of 95:5 to 6:4.

6. The polymer membrane of claim 5, wherein the polymer membrane has a pore size of 0.1 μm to 0.3 μm, a thickness of 250 μm to 350 μm, a water contact angle of 10º to 50º, an oil contact angle of 40º to 90º, and a weight ratio of the matrix polymer to the functional polymer of 9:1 to 7:3.

7. The polymer membrane of claim 4, wherein the matrix polymer is polyvinylidene fluoride, polytetrafluoroethylene, polycarbonate, polyethylene terephthalate, polypropelene, polyamide, or a combination thereof.

8. The polymer membrane of claim 7, wherein the polymer membrane has a pore size of 0.05 μm to 0.5 μm, a thickness of 100 μm to 500 μm, a water contact angle of 5º to 55º, an oil contact angle of 40º to 95º, and a weight ratio of the matrix polymer to the functional polymer of 95:5 to 6:4.

9. The polymer membrane of claim 8, wherein the polymer membrane has a pore size of 0.1 μm to 0.3 μm, a thickness of 250 μm to 350 μm, a water contact angle of 10º to 50º, an oil contact angle of 40º to 90º, and a weight ratio of the matrix polymer to the functional polymer of 9:1 to 7:3.

10. The polymer membrane of claim 7, wherein the matrix polymer is polyvinylidene fluoride, and the functional polymer is the polymer of claim 1.

11. The polymer membrane of claim 10, wherein the polymer membrane has a pore size of 0.05 μm to 0.5 μm, a thickness of 100 μm to 500 μm, a water contact angle of 5º to 55º, an oil contact angle of 40º to 95º, and a weight ratio of the matrix polymer to the functional polymer of 95:5 to 6:4.

12. The polymer membrane of claim 11, wherein the polymer membrane has a pore size of 0.1 μm to 0.3 μm, a thickness of 250 μm to 350 μm, a water contact angle of 10º to 50º, an oil contact angle of 40º to 90º, and a weight ratio of the matrix polymer to the functional polymer of 9:1 to 7:3.

13. The polymer membrane of claim 7, wherein the matrix polymer is polyvinylidene fluoride, and the functional polymer is the polymer of claim 2.

14. The polymer membrane of claim 13, wherein the polymer membrane has a pore size of 0.05 μm to 0.5 μm, a thickness of 100 μm to 500 μm, a water contact angle of 5º to 55º,

an oil contact angle of 40º to 95º, and a weight ratio of the matrix polymer to the functional polymer of 95:5 to 6:4.

15. The polymer membrane of claim 14, wherein the polymer membrane has a pore size of 0.1 µm to 0.3 µm, a thickness of 250 µm to 350 µm, a water contact angle of 10º to 50º, an oil contact angle of 40º to 90º, and a weight ratio of the matrix polymer to the functional polymer of 9:1 to 7:3.

16. The polymer membrane of claim 7, wherein the matrix polymer is polyvinylidene fluoride, and the functional polymer is the polymer of claim 3.

17. The polymer membrane of claim 16, wherein the polymer membrane has a pore size of 0.05 µm to 0.5 µm, a thickness of 100 µm to 500 µm, a water contact angle of 5º to 55º, an oil contact angle of 40º to 95º, and a weight ratio of the matrix polymer to the functional polymer of 95:5 to 6:4.

18. The polymer membrane of claim 17, wherein the polymer membrane has a pore size of 0.1 µm to 0.3 µm, a thickness of 250 µm to 350 µm, a water contact angle of 10º to 50º, an oil contact angle of 40º to 90º, and a weight ratio of the matrix polymer to the functional polymer of 9:1 to 7:3.

19. A method for making polymeric membrane of claim 4 comprising:

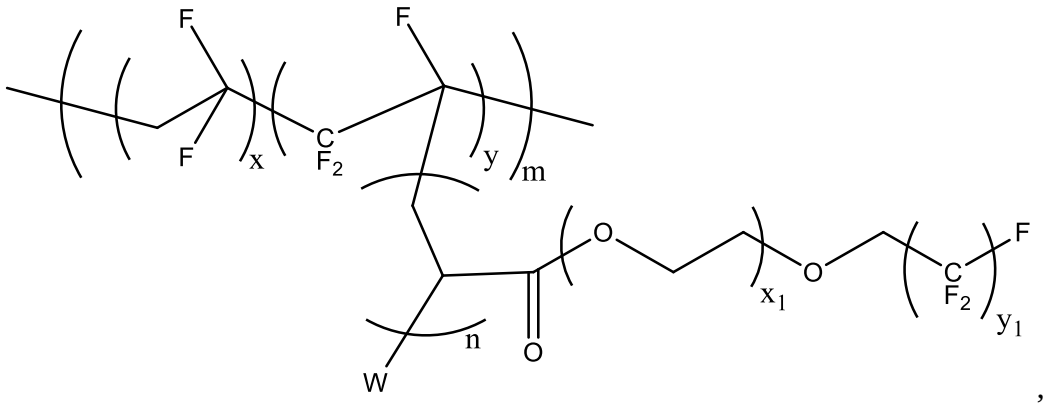
dissolving a matrix polymer and a functional polymer in a blend solvent to obtain a blend solution,

degassing the blend solution to obtain a deaerated solution, and

immersing the deaerated solution into a coagulation liquid to form the polymeric membrane,

wherein the matrix polymer is hydrophobic and the functional polymer contains a hydrophobic backbone and hydrophilic side chains, the side chains each having an

oleophobic terminal segment and a hydrophilic internal segment, the functional polymer being of the following formula:



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in which W is a halogen, m is 10 to 1000, n is 1 to 1000, x is 50 to 1000, y is 1 to 200, x_1 is 1 to 100, and y_1 is 1 to 100.

20. The method of claim 19, wherein the immersing step is performed by extruding the deareated solution into the coagulation liquid to form a hollow fiber membrane.