WHAT IS CLAIMED IS:

1. A copolymer, comprising:

a plurality of first repeat units, wherein the first repeat units are zwitterionic;

a plurality of second repeat units; wherein at least some of the second repeat units each independently comprise a cross-linkable moiety; and

a plurality of third repeat units, wherein at least some of the third repeat units are ionizable and the second repeat units and the third repeat units are different.

2. The copolymer of claim 1, wherein each of the first repeat units independently comprises sulfobetaine, carboxybetaine, phosphorylcholine, imidazolium alkyl sulfonate, pyridinium alkyl sulfonate, or a carboxybetaine group.

3. The copolymer of claim 1 , wherein each of the zwitterionic repeat units is independently formed from sulfobetaine acrylate, sulfobetaine acrylamide, carboxybetaine acrylate, carboxybetaine methacrylate, 2-methacryloyloxyethyl phosphorylcholine, acryloxy phosphorylcholine, phosphorylcholine acrylamide, phosphorylcholine methacrylamide, carboxybetaine acrylamide, carboxybetaine vinyl pyridine, carboxybetaine vinyl imidazole, 3-(2-vinylpyridinium-1-yl)propane-1-sulfonate, 3-(4-vinylpyridinium-l-yl)propane-1-sulfonate, sulfobetaine methacrylate, or combinations thereof.

4. The copolymer of any one of claims 1-3, wherein at least a portion of the second repeat units comprise hydrophobic repeat units.

5. The copolymer of any one of claims 1-3, wherein at least a portion of the second repeat units comprise hydrophilic repeat units.

6. The copolymer of claim 4, wherein the hydrophobic repeat units are independently formed from a styrene, an alkyl acrylate, an alkyl methacrylate, an alkyl acrylamide, an acrylonitrile, an aryl acrylate, an aryl methacrylate, an aryl acrylamide, an allyl acrylate, an allyl acrylamide, an allyl methacrylamide, a vinyl methacrylate, a vinyl methacrylamide, a vinyl

acrylamide, an allyl vinyl benzene (styrene derivative), a cinnamate, benzophenone, isopropyl thioxanthone, or combinations thereof.

7. The copolymer of any one of claims 1-6, wherein a second portion of the second repeat units comprise a second type of hydrophobic repeat units.

8. The copolymer of claim 7, wherein the second type of hydrophobic repeat units are each independently formed from an alkyl acrylate, an alkyl methacrylate, an alkyl acrylamide, an acrylonitrile, an aryl acrylate, an aryl methacrylate, an aryl acrylamide, a trifluoroethyl methacrylate, a methyl methacrylate, an ethyl methacrylate, a n-propyl methacrylate, a n-butyl methacrylate, an acrylonitrile, a styrene, or combinations thereof.

9. The copolymer of any one of claims 1-8, wherein at least some of the second repeat units do not comprise a cross-linkable moiety.

10. The copolymer of claim 9, wherein the second repeat units that do not comprise a cross-linkable moiety are each independently formed from an acrylate, a methacrylate, an acrylamide, a methacrylamide, a trifluoroethyl methacrylate, a methyl methacrylate, an ethyl methacrylate, a n-propyl methacrylate, a n-butyl methacrylate, acrylonitrile, a styrene, or combinations thereof.

11. The copolymer of any one of claims 1-10, wherein the cross-linkable moiety comprises a carbon-carbon double bond.

12. The copolymer of any one of claims 1-10, wherein the cross-linkable moiety is polymerized (e.g., cross-linked) via exposure to one or more of a free radical photoinitiator, electromagnetic radiation, high temperature, a redox reaction, or combinations thereof.

13. The copolymer of any one of claims 1-11 and 12, wherein each of the ionizable third repeat units is independently formed from a 3-sulfopropyl methacrylate potassium salt, a methacrylate, an acrylate, an acrylamide a styrene derivative comprising one or more of a

carboxylate, a carboxylic acid, a sulfonate, a sulfonic acid, an amine, an amino acid, a phosphate, a phosphonic acid, a phosphonium, a boronate, or a boronic acid, or combinations thereof.

14. A cross-linked copolymer network comprising the copolymer of any one of the preceding claims.

15. A thin film composite membrane comprising:
a porous substrate; and
a selective layer comprising the cross-linked copolymer network of claim 14.

16. The thin film composite membrane of claim 15, wherein the average effective pore size of the porous substrate is larger than the average effective pore size of the selective layer.

17. The thin film composite membrane of claim 15, wherein the selective layer is disposed on top of the porous substrate.

18. The thin film composite membrane of claim 15, wherein the selective layer has an average effective pore size of about 0.1 nm to about 2.0 nm.

19. The thin film composite membrane of any one of claims 15-18, wherein the selective layer has a thickness of about 10 nm to about 10 um.

20. The thin film composite membrane of any one of claims 15-18 and 19, wherein the thin film composite membrane rejects charged solutes and salts.

21. The thin film composite membrane of any one of claims 15 - 18, 19, and 20, wherein the selective layer exhibits different anion rejections for salts with the same cation.

22. The thin film composite membrane of any one of claims 15 -18, 19, 20 and 21, wherein the selective layer exhibits rejection of > 99% for neutral molecule with hydrated diameter of about or greater than 1 nm.

23. A method of making a thin film composite membrane comprising:
providing the copolymer of any one of claims 1-11, 12 and 13;
depositing the copolymer on to a porous substrate; and
activating the cross-linkable groups of the copolymer to form additional bonds therebetween.

24. The method of claim 23, wherein the step of activating the cross-linkable groups of the copolymer comprises one or more of: exposing the membrane to a free radical photoinitiator, electromagnetic radiation, a free radical photoinitiator and a dithiol, combinations thereof.

25. The method of claim 24, wherein the step of exposing the membrane to a free radical photoinitiator comprises exposing the membrane to a solvent containing the free radical photo-initiator and/or the free radical photoinitiator and a dithiol.

26. The method of claim 24, wherein the step of exposing the membrane to electromagnetic radiation comprises exposing the membrane to ultraviolet light and/or an electron beam.