Claims:

1. A coated filter membrane comprising:

a porous polymeric filter layer,

a crosslinked polyamide film coating surfaces of the porous polymeric filter layer, wherein the crosslinked polyamide film comprises a coagulated polyamide polymer that is soluble in a solvent other than formic acid or calcium chloride and is crosslinked on the polymeric filter layer with a free radical source material, and

residual free radical source material;

~~non-porous crosslinked polyamide film coating at a surface of the porous filter layer~~wherein the porous polymeric filter layer comprises a polyolefin, a polyhaloolefin, a polyimide, a polyetherimide, a polysulfone, a polyethersulfone, a polycarbonate, or a fluoropolymer and is a microporous filter membrane or an ultraporous filter membrane having a pore size in a range of from 0.001 to 10 microns, wherein the coated filter membrane is liquid permeable.

2. The coated filter membrane of claim 1, wherein the coagulated polyamide polymer comprises a backbone having a cyclic linkage.

3. The coated filter membrane of claim 2, wherein the cyclic linkage is a di-cyclohexenyl linkage.

4. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 3~~, wherein the coagulated polyamide polymer is derived from a linear monomer selected from~~:~~ caprolactam, and hexamethylenediamine adipate, and non-linear monomer selected from a cyclic reactive compound and a di-cyclic reactive compound.

5. The coated filter membrane of claim 4, wherein the non-linear ~~polymer~~ monomer is 4,4-diamino-dicyclohexylmethane adipate.

6. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 5~~, wherein the membrane has a dye-binding capacity for methylene blue dye of at least 0.2 micrograms per milligram of the membrane.

~~7. The coated filter membrane of any of claims 1 through 6, wherein less than 1.0 ng/cm^2 of magnesium, as measured by inductively coupled plasma mass spectrometry (ICP-MS), is~~

~~extracted from a sample of the membrane having a diameter of 47 mm and a thickness of 55 microns when the sample is soaked in 15 ml of a 0.1 N solution of HCl for 24 hours.~~

~~8. The coated filter membrane of any of claims 1 to 7 further comprising residual free-radical source material.~~

~~9~~7. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 8~~, wherein the porous polymeric filter layer has a porosity of from ~~at least~~ 50 percent to 98 percent.

~~10~~8. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 9~~, wherein the porous polymeric filter layer is an ultraporous filter membrane having ~~has~~ a pore size in a range from 0.001 to ~~10~~0.05 microns.

~~11~~9. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 10~~ having bubble point in a range from 2 to 400 psi, measured using HFE 7200, at a temperature of 20-25 degrees Celsius.

~~12~~10. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 11~~, wherein the porous polymeric filter layer has a thickness in a range from 5 to 100 microns.

~~13~~11. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 12~~, wherein the porous polymeric filter layer comprises a polymer ~~is~~ selected from polyethylene and polypropylene.

~~14~~12. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 13~~, wherein the porous polymeric filter layer is ultra high molecular weight polypropylene.

~~15~~13. The coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 14~~, wherein the crosslinked polyamide film is resistant to propylene glycol methyl ether (PGME), propylene glycol methylether acetate (PGMEA), or cyclohexanone.

14. The coated filter membrane of claim 1, wherein the crosslinked polyamide film coating is porous.

15. The coated filter membrane of claim 1, wherein the crosslinked polyamide film coating is non-porous.

16. The coated filter membrane of claim 1, wherein the porous polymeric filter layer is an ultrahigh molecular weight polyethylene (UPE).

~~16~~17. A filter cartridge that includes the membrane of ~~any of~~ claim~~s~~ 1 ~~through 15~~.

~~17~~18. A filter that includes the membrane of ~~any of~~ claim~~s~~ 1 ~~through 15~~.

~~18~~19. A method of using the coated filter membrane of ~~any of~~ claim~~s~~ 1 ~~through 15~~, the method comprising passing solvent-based liquid through the membrane.

~~19~~20. The method of claim ~~18~~19, wherein the liquid comprises solvent selected from propylene glycol methyl ether (PGME), propylene glycol methylether acetate (PGMEA), and cyclohexanone.

~~20. The method of claim 18 or 19, wherein the coated filter membrane removes one or more of Al, Ti, Cr, Mn, Fe, Ni, or Sn from the solvent-based liquid.~~

21. A method of preparing a coated filter membrane of claim 1, the method comprising:

coating polymer solution onto a surface of a porous polymeric filter layer, wherein the porous polymeric filter layer comprises a polyolefin, a polyhaloolefin, a polyimide, a polyetherimide, a polysulfone, a polyethersulfone, a polycarbonate, or a fluoropolymer, the polymer solution comprising: polyamide polymer, solvent, and free-radical source material;

causing polyamide of the polymer solution to coagulate on the surface; and

crosslinking the polyamide, wherein the porous polymeric filter layer is a microporous filter membrane or an ultraporous filter membrane having a pore size in a range of from 0.001 to 10 microns.

22. The method of claim 21, wherein the solvent is selected from an aliphatic alcohol and a chlorinated hydrocarbon.

23. The method of claim 21, wherein the solvent is selected from methanol, ethanol, propanol, butanol, isopropanol, one or more chlorinated hydrocarbon, and combinations thereof.

24. The method of claim ~~22 or 23~~ 21, wherein the solvent contains an amount of water.

~~25. The method of any of claims 21 through 24, wherein the solvent does not include calcium chloride or formic acid.~~

~~26~~25. The method of claim 21, wherein the solvent comprises propanol and up to 20 weight percent water based on total weight solvent.