CLAIMS

1. A dope solution comprising a PVDF resin, a water soluble or hydrogel polymer, and optionally additives, in a solvent, said solvent comprising a blend of triethylphosphate (TEP) and N-methylpyrrolidone (NMP).
2. The dope solution of claim 1, wherein the ratio of TEP to NMP is from 75:25 to 1:99 by weight.
3. The dope solution of claim 1, wherein the ratio of TEP to NMP is from 75:25 to 30:70 by weight.
4. The dope solution of claim 1, wherein the ratio of TEP to NMP is from 70:30 to 50:50, preferably 65:35 to 50:50.
5. The dope solution of any one of claims 1 to 4, wherein the amount of PVDF is from 12% to 25% by weight, preferably from 18% to 20% based on the total dope solution weight.
6. The dope solution of any one of claims 1 to 5, wherein the PVDF resin has melt viscosity is from 18 to 45 kilopoise, preferably from 25 to 42 kilopoise.
7. The dope solution of any one of claims 1 to 6, wherein the PVDF resin comprises a homopolymer resin.
8. The dope solution of any one of claims 1 to 6, wherein the PVDF resin comprises a copolymer of VDF and at least one of hexafluoropropylene, trifluoroethylene, chlorotrifluoroethylene, or a tetrafluoropropene.
9. The dope solution of any one of claims 1 to 8, wherein the PVDF polymer comprises a mixture of PVDF polymer with different viscosities.
10. The dope solution of any one of claims 1 to 9, wherein the optional additive comprises an acrylic resin in an amount of from 0 to 20% by weight, preferably from 1 to 20%, based on the total weight of polymer P and the acrylic resin in the dope solution.
11. The dope solution of any one of claims 1 to 10, wherein the optional additive comprises an acrylic resin said acrylic resin being selected from the group consisting of a PMMA resin; a PMMA copolymer resin containing acrylic acid ester comonomers; a PMMA copolymer resin containing hydroxyethylmethacrylate comonomer; a PMMA copolymer resin containing methoxy-polyethyleneglycol methacrylate; a PMMA copolymer resin containing polyethylene glycol methacrylate comonomer; a PMMA resin containing zwitterionic functional groups; a PMMA resin containing sulfonic acid groups; and a block copolymer

composed of a pure PMMA block and a second block containing both hydrophilic comonomers such as HEMA or PEGMA and hydrophobic comonomers such as an alkylacrylates.

12. The dope solution of any one of claims 1 to 11, wherein the dope solution has a viscosity of between 50,000 and 250,000 centipoise, preferably between 80,000 and 180,000 cps, as measured by a Brookfield viscometer at 70°C, 50 RPM, with a #7 spindle.
13. The dope solution of any one of claims 1 to 12, wherein the water soluble water hydrogel polymer comprises at least one of polyvinyl pyrrolidone, polyethylene oxide, polyethylene oxide/polypropylene oxide block copolymers or mixtures thereof
14. The dope solution of any one of claims 1 to 12, wherein the hydrogel polymer comprises at least one of poly-hydroxyethylmethacrylate (poly-HEMA), poly-N-isopropylacrylamide (PNIPAM), poly-ethyleneglycolmethacrylate (PEGMA), crosslinked PVP or copolymers thereof.
15. A process for casting a membrane comprising the steps of:
    a) providing a dope solution (PS) comprising a PVDF resin, a water soluble or hydrogel polymer, and optionally additives, in a solvent comprising a triethylphosphate and N-methylpyrrolidone blend where the ratio of TEP to NMP is from 75:25 to 1:99 by weight;
    b) degassing the dope solution of step a);
    c) extruding the dope solution,
    d) passing the extruded dope solution through a non-solvent bath to form a porous membrane;
    e) soaking the porous membrane in water;
    f) optionally soaking the porous membrane in a sodium hypochlorite solution (0.5wt% - 7.5 wt%);
    g) optionally rinsing of the membrane with fresh water after soaking in sodium hypochlorite;
    h) conditioning of the membrane with wetting agents.

16. The process of claim 15, wherein the ratio of TEP to NMP is from 75:25 to 1:99 by weight.
17. The process of claim 15, wherein the ratio of TEP to NMP is from 75:25 to 30:70 by weight.

18. The process of claim 15, wherein the ratio of TEP to NMP is from 70:30 to 50:50, preferably 65:35 to 50:50.
19. The process of any one of claims 15 to 18, wherein the amount of PVDF is from 12% to 25% by weight, preferably from 18% to 20% based on the total dope solution weight.
20. The process of any one of claims 15 to 19, wherein the PVDF resin has melt viscosity between 18 and 45 kilopoise, preferably between 25 and 42 kilopoise.
21. The process of any one of claims 15 to 20, wherein the PVDF resin comprises a homopolymer resin.
22. The process of any one of claims 15 to 20, wherein the PVDF resin comprises a copolymer of VDF and at least one of hexafluoropropylene, trifluoroethylene, chlorotrifluoroethylene or a tetrafluoropropene.
23. The process of any one of claims 15 to 22, wherein the PVDF polymer comprises a mixture of PVDF polymer with different viscosities.
24. The process of any one of claims 15 to 23, wherein the optional additive comprises an acrylic resin additive in an amount of from 0 to 20% by weight, preferably from 1 to 20%, based on the total weight of polymer P and the acrylic additive in the dope solution.
25. The process of any one or more of claims 15 to 24, wherein the optional additive comprises an acrylic resin , said acrylic resin being selected from the group consisting of a polymethylmethacrylate (PMMA) resin; a PMMA copolymer resin containing acrylic acid ester comonomers; a PMMA copolymer resin containing hydroxyethylmethacrylate comonomer; a PMMA copolymer resin containing methoxy-polyethyleneglycol methacrylate; a PMMA copolymer resin containing polyethylene glycol methacrylate comonomer; a PMMA resin containing zwitterionic functional groups; a PMMA resin containing sulfonic acid groups; and a block copolymer comprising a pure PMMA block and a second block containing both a hydrophilic comonomer such as HEMA or PEGMA and a hydrophobic comonomer such as an alkylacrylate.
26. The process of any one of claims 15 to 25, wherein the non-solvent bath described in step d) comprises at least one of: water; a mixture of water and solvents, such as NMP or TEP; a mixture of water and alcohols; mixture of water and glycerol; or a mixture of water and propylene glycol.

27. The process of any one of claims 15 to 26, wherein the wetting agent is selected from the group consisting of glycerol, propylene glycol, butylene glycol, hexylene glycol, and mixtures or aqueous solutions thereof.
28. The process of any one of claims 15 to 27, wherein the dope solution is extruded in step c) through a hollow fiber die (tube in orifice design) while injecting a bore liquid in the bore of the membrane.
29. The process of claim 28, wherein the bore liquid comprises a mixture of water, TEP and NMP.
30. The process of claim 29, wherein the water, TEP and NMP is in the ratio of 50 to 80% water 20 – 40% TEP and 0 – 25% NMP by weight based on total weight of the water, TEP and NMP; preferably in the ratio of 50 – 70% water, 15 – 25% TEP and 5 – 25% NMP.
31. The process of any one of claims 15 to 30, further comprising a further step of d2) passing the extruded dope solution through a second non-solvent bath after the first non-solvent bath.
32. The process of claim 31, wherein the second non-solvent bath is selected from the group consisting of water, a mixture of water and surfactant, a mixture of water and glycerol, a mixture of water and propylene glycol, and a mixture of water and polyethylene glycol.
33. The process of any one of claims 15 to 32, wherein the dope solution is extruded onto a hollow braided fiber.
34. The process of any one of claims 15 to 33, wherein the dope solution is extruded onto a porous or non-porous support.
35. The process of any one of claims 15 to 34, wherein the water soluble polymer comprises at least one of polyvinyl pyrrolidone, polyethylene oxide, polyethylene oxide/polypropylene oxide block copolymers or mixtures thereof.
36. The process of any one of claims 15 to 34, wherein the hydrogel polymer comprises at least one of poly-hydroxyethylmethacrylate (poly-HEMA), poly-N-isopropylacrylamide (PNIPAM), poly-ethyleneglycolmethacrylate (PEGMA), crosslinked PVP or copolymers thereof.
37. The membrane produced by the process of any one of claims 15 to 36, wherein said membrane has a pure water permeability between 100 and 1000 LMHB, a mechanical strength in the range of 4.0 to 6.0 MPa, and an elongation to break of in the range 90 to 200%, preferably 100 to 200%.

38. The use of the membrane produced by the process of any one of claims 15 to 36 for water filtration, including potable water, waste water, industrial process water, and for membrane bio-reactors.
39. The use of the dope solution of any one of claims 1 to 14, to make a membrane.
40. The use as claimed in claim 39, wherein the membrane is used for water filtration, including potable water, waste water, industrial process water, and for membrane bio-reactors.