CLAIMS

1. A method of producing a monovalent selective cation exchange membrane, comprising:

chemically adsorbing an acrylic intermediate layer comprising a chlorosulfonated methacrylate group to a cross-linked ion-transferring polymeric layer on a surface of a polymeric microporous substrate;

aminating the chlorosulfonated methacrylate group to attach an amine group layer to the surface of the polymeric microporous substrate; and

functionalizing the amine group layer with a charged compound layer to produce the monovalent selective cation exchange membrane.

2. The method of claim 1, comprising polymerizing the acrylic intermediate layer by exposure to ultraviolet light.

3. The method of claim 1, comprising chemically adsorbing 2-(methacryloyloxy) ethylsulfonil chloride to the cross-linked ion-transferring polymeric layer on a surface of a polymeric microporous substrate.

4. The method of claim 3, comprising aminating the 2-(methacryloyloxy)-ethylsulfonil chloride with PEI.

5. The method of claim 3, comprising aminating the 2-(methacryloyloxy)-ethylsulfonil chloride with branched PEI having a molecular weight of at least 600 g/mol.

6. The method of claim 1, comprising functionalizing the amine group layer with a positively charged group.

7. The method of claim 6, comprising functionalizing the amine group layer with a positively charged ammonium.

8. The method of claim 1, further comprising soaking the polymeric microporous substrate with a solution comprising an ionogenic monomer, a multifunctional monomer, and a polymerization initiator to produce the cross-linked ion-transferring polymeric layer.

9. A monovalent selective cation exchange membrane support, comprising:

a polymeric microporous substrate;

a cross-linked ion-transferring polymeric layer on a surface of the substrate; and

an intermediate layer comprising a surface amine group and covalently bound to the cross-linked ion-transferring polymeric layer by 2-(methacryloyloxy)-ethylsulfonil chloride.

10. The monovalent selective cation exchange membrane support of claim 9, wherein the surface amine group is a primary amine group or a secondary amine group and wherein the intermediate layer comprises polyethylenimine (PEI).

11. The monovalent selective cation exchange membrane support of claim 9, wherein the surface amine group is a primary amine group or a secondary amine group and wherein the intermediate layer comprises a branched PEI having a molecular weight of at least 600 g/mol.