WHAT IS CLAIMED IS:

1. A method for preparing a porous polymer semipermeable membrane, comprising the following steps:

mixing and dissolving a hydrophobic polynorbornene-based polymer and a hydrophilic small-molecule crosslinking agent containing a thiol functional group, in a solvent capable of dissolving both of them, to obtain a coating solution;

applying the coating solution on the surface of a biosensor electrode;

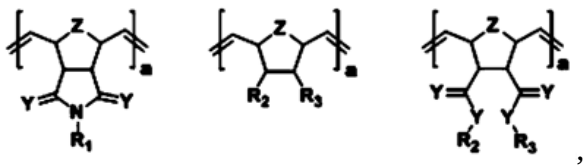
subjecting the coated coating solution to first drying to form a film, and obtaining a polymer semipermeable membrane, wherein the hydrophobic polynorbornene-based polymer and the hydrophilic small-molecule crosslinking agent are phase-separated in the process of the first drying;

crosslinking the polymer semipermeable membrane after the first drying;

removing the unreacted hydrophilic small-molecule crosslinking agent from the polymer semipermeable membrane; and

subjecting the polymer semipermeable membrane to second drying to obtain the porous polymer semipermeable membrane,

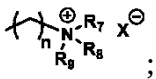
wherein the hydrophobic polynorbornene-based polymer has a structural formula as shown below:



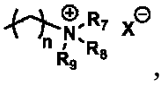
,

where Z is CH_2, CH_2CH_2, O, S, N-R_4 or C=C(R_5R_6);

Y is O, S or NH;

R_1 is H, a linear/branched/cyclic hydrocarbyl group, a lipid/ether-containing group or ;

R_2 and R_3 are selected from a group consisting of linear/branched/cyclic hydrocarbyl

groups and , and R_2 and R_3 are identical or different;

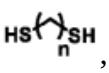
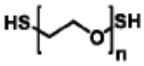
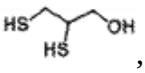
R_4 is a linear/branched/cyclic hydrocarbyl group;

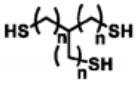
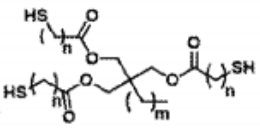
R_5 is H or an alkyl group, R_6 is H or an alkyl group, and R_5 and R_6 are identical or different;

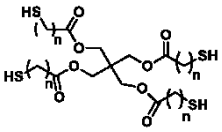
n = 1-10, R_7 is H or an alkyl group, R_8 is H or an alkyl group, R_9 is H or an alkyl group, and R_7, R_8 and R_9 are identical or different;

wherein the hydrophobic polynorbornene-based polymer has a molecular weight of 10,000 g/mol - 2,000,000 g/mol; and the hydrophilic small-molecule crosslinking agent contains at least two thiol functional groups.

2. The method for preparing a porous polymer semipermeable membrane according to claim 1, wherein the molecular weight of the hydrophobic polynorbornene-based polymer is 200,000 g/mol - 1,000,000 g/mol; and the hydrophilic small-molecule crosslinking agent contains 2-4 thiol functional groups.

3. The method for preparing a porous polymer semipermeable membrane according to claim 2, wherein the structural formula of the hydrophilic small-molecule crosslinking agent containing two thiol functional groups is , ,  or , where n = 1-10;

the structural formula of the hydrophilic small-molecule crosslinking agent containing three thiol functional groups is  or , where n = 1-10, m = 0-5, and the thiol branches are identical or different in length;

the structural formula of the hydrophilic small-molecule crosslinking agent containing four thiol functional groups is: , where n is 1-10, and the thiol branches are

identical or different in length.

4.. The method for preparing a porous polymer semipermeable membrane according to claim 1, wherein the hydrophobic polynorbornene-based polymer and the hydrophilic small-molecule crosslinking agent are in such a ratio that the molar ratio of C=C : -SH is from 10:1 to 1:20; the solvent is one or a mixture of any two selected from the group consisting of tetrahydrofuran, ethanol, propanol, isopropanol, butanol, ethylene glycol and water; the mass concentration of the hydrophobic polynorbornene-based polymer in the coating solution is 1%-25%.

5. The method for preparing a porous polymer semipermeable membrane according to claim 1, wherein the coating is dip coating, spin coating, knife coating or spray coating; the coating is carried out at an ambient temperature of 15-60°C; and the two drying steps are both carried out at 15-80°C and each drying step lasts for 1 min to 2 hrs.

6. The method for preparing a porous polymer semipermeable membrane according to claim 5, wherein the coating is carried out at an ambient temperature of 25-50°C; after the first drying step, the membrane is placed in a gaseous solvent environment to further promote the phase separation between the hydrophobic component and the hydrophilic component, and the gaseous solvent is the solvent used for dissolving the hydrophobic polynorbornene-based polymer.

7. The method for preparing a porous polymer semipermeable membrane according to claim 1, wherein the crosslinking is UV crosslinking or heat crosslinking of the polymer semipermeable membrane coated on the surface of the biosensor electrode; the UV crosslinking is carried out at a wavelength of 250-400 nm; and the heat crosslinking is carried out at 50-80°C for 0.5-4 hrs.

8. A porous polymer semipermeable membrane prepared by the method according to any one of claims 1 to 7.

9. The porous polymer semipermeable membrane according to claim 8, wherein the membrane has a thickness of 200 nm - 100 μm.