CLAIMS

1. A method for producing contact lenses according to procedure (I) or (II),

wherein procedure (I) comprises the steps of: (a) obtaining preformed contact lenses; (b) selecting a surface treatment or a combination of two or more surface treatments, coating materials, and coating conditions under which the selected coating materials can be applied onto a contact lens according to the selected surface treatment or the selected combination of the two or more surface treatments to obtain a coated contact lens having a first target lubricity profile as characterized by having a first velocity-weighted average coefficient of friction, $\overline{CoF}_{v_1}$ of about 450×10^{-3} or less; and (c) applying the selected coating materials onto the preformed contact lenses under the selected coating conditions to form the contact lenses each having the first target lubricity profile,

wherein procedure (II) comprises the steps of: (a) selecting a mold material for making lens molds; (b) selecting a lens formulation and curing conditions under which the selected lens formulation can be cured in the selected mold under the selected curing conditions to form a contact lens having a second target lubricity profile as characterized by having a second velocity-weighted average coefficient of friction, $\overline{CoF}_{v_2}$ of about 450×10^{-3} or less, wherein the lens formulation comprises at least one lubricating agent for imparting the second target lubricity profile to the formed contact lens; and (c) introducing and curing the selected lens formulation in the lens molds to form the contact lenses each having the second target lubricity profile,

wherein $\overline{CoF}_v$ is calculated according to Equation (1)

$$\overline{CoF}_v = \int_{v_0^S}^{v_f^S} \frac{CoF(v_i^S)}{v_i^S} d(v_i^S) \qquad (1)$$

in which $CoF(v_i^s)$ is coefficient of friction

$$\left(\frac{FT(v_i^s)}{FN}\right)$$

measured at a sliding speed v_i^s, FN is the applied normal force acting on a testing lens under test against a standard counter surface of a standard substrate, and $FT(v_i^s)$ is a tangential force or horizontal force resulted from the sliding motion of the testing lens relative to the standard counter surface at the sliding speed v_i^s which is generated by reciprocally moving the standard substrate relative to the testing lens first at an acceleration rate of 10 mm/s^2 along a path of about 25 mm and then at a deceleration rate of 10 mm/s^2 along a path of about 25 mm.

2. The method of claim **1**, wherein the first and second velocity-weighted average coefficients of friction independent of each other are about 350×10^{-3} or less.

3. The method of claim **1**, wherein the contact lens is produced according procedure (I).

4. The method of claim **3**, wherein the preformed contact lenses are non-silicone hydrogel contact lenses.

5. The method of claim **3**, wherein the preformed contact lenses are silicone hydrogel contact lenses.

6. The method of claim **3**, wherein the selected surface treatment of the selected combination of the two or more surface treatments comprises a plasma treatment, a graft-polymerization of one or more hydrophilic vinylic monomers and/or macromers, a layer-by-layer deposition of one or more first hydrophilic polymeric materials, covalently attachment of one or more second hydrophilic polymeric materials, or a combination thereof.

7. The method of claim **6**, wherein the plasma treatment is carried out under low pressure and is a process of plasma-induced polymerization, a plasma grafting, plasma oxidation, or combination thereof.

8. The method of claim 6, wherein the plasma treatment is carried out at a surrounding atmospheric pressure.

9. The method of claim 6, wherein the one or more first hydrophilic polymeric materials comprise at least one polyanionic material selected from the group consisting of polyacrylic acid, polymethacrylic acid, polyethylacrylic acid, poly(acrylic acid-co-methacrylic acid), poly(acrylic acid-co-ethacrylic acid), poly(methacrylic acid-co-ethacrylic acid), and a mixture thereof.

10. The method of claim 6, wherein the graft-polymerization is carried out with one or more hydrophilic vinylic monomers selected from the group consisting of acrylamide, N,N-dimethylacrylamide (DMA), N,N-dimethylmethacrylamide (DMMA), 2-acrylamidoglycolic acid, N-hydroxypropylacrylamide, N-hydroxyethyl acrylamide, N-[tris(hydroxymethyl)methyl]-acrylamide, N-vinylpyrrolidone, N-vinyl formamide, N-vinyl acetamide, N-vinyl isopropylamide, N-vinyl-N-methyl acetamide, N-methyl-3-methylene-2-pyrrolidone, 1-methyl-5-methylene-2-pyrrolidone, 5-methyl-3-methylene-2-pyrrolidone, 2-hydroxyethylmethacrylate (HEMA), 2-hydroxyethyl acrylate (HEA), trimethylammonium 2-hydroxy propylmethacrylate hydrochloride, aminopropyl methacrylate hydrochloride, dimethylaminoethyl methacrylate (DMAEMA), glycerol methacrylate (GMA), a C_1-C_4-alkoxy polyethylene glycol (meth)acrylate having a number average molecular weight of up to 1500, (meth) acrylic acid, and mixtures thereof) in the presence or absence of a hydrophilic crosslinking agent.

11. The method of claim 6, wherein the coating of each contact lenses comprises a reactive base coating reactive functional groups and a hydrogel coating on top of the reactive base coating, wherein the reactive base coating is: an LbL coating, a plasma coating, combination of a plasma coating and an LbL coating thereon; a layer of one or more hydrophilic polymers obtained by covalently attachment or graft polymerization; combination of a layer of one or more hydrophilic polymers and an LbL coating thereon; or combination of plasma coating, a layer of one more hydrophilic polymers on top of the plasma coating, and an LbL coating on top of the layer of one or more hydrophilic polymers.

12. The method of claim 11, wherein the hydrogel top coating is obtained by heating a contact lens with a reactive base coating thereon in a solution comprising a water-soluble and thermally-crosslinkable hydrophilic polymeric material at a temperature of from about 60° C. to about 140° C. for a time period sufficient long to crosslink the water-soluble thermally-crosslinkable hydrophilic polymeric material and the base coating so as to form a hydrogel coating on the contact lens.

13. The method of claim 12, wherein the water-soluble and thermally-crosslinkable hydrophilic polymeric material is a poly(2-oxazoline-co-ethyleneimine)-epichlorohydrin, a chemically-modified poly(2-oxazoline-co-ethyleneimine)-epichlorohydrin, a chemically-modified polyamidoamine-epichlorohydrin, or combinations thereof, wherein the chemically-modified poly(2-oxazoline-co-ethyleneimine)-epichlorohydrin or the chemically-modified polyamidoamine-epichlorohydrin comprises (i) from about 20% to about 95% by weight of first polymer chains derived from a polyamidoamine-epichlorohydrin or a poly(2-oxazoline-co-ethyleneimine)-epichlorohydrin, (ii) from about 5% to about 80% by weight of hydrophilic moieties or second polymer chains derived from at least one hydrophilicity-enhancing agent having at least one reactive functional group selected from the group consisting of amino group, carboxyl group, thiol group, and combination thereof, wherein the hydrophilic moieties or second polymer chains are covalently attached to the first polymer chains through one or more covalent linkages each formed between one azetitdinium group of the polyamidoamine-epichlorohydrin or the poly (2-oxazoline-co-ethyleneimine)-epichlorohydrin and one amino, carboxyl or thiol group of the hydrophilicity-enhancing agent, and (iii) azetidinium groups which are parts of the first polymer chains or pendant or terminal groups covalently attached to the first polymer chains.

14. The method of claim 1, wherein the contact lens is produced according procedure (II).

15. The method of claim 14, wherein the lens formulation comprises at least one N-vinyl type vinylic monomer.

16. The method of claim 15, wherein the N-vinyl type vinylic monomer is N-vinylpyrrolidone, N-vinyl acetamide, N-vinyl-N-methyl acetamide, or combinations thereof.

17. The method of claim 14, wherein the lens formulation comprises at least one non-crosslinkable hydrophilic polymer having a number average molecular weight M_n of from 5,000 to 1,000,000 Daltons.

18. A method of manufacturing contact lenses, comprising the step of:

inspecting manufactured contact lenses for having a target lubricity profile as characterized by having a velocity-weighted average coefficient of friction, $\overline{CoF_v}$, of about 450×10^{-3} or less; and discarding those contact lenses which do not have the target lubricity,

wherein $\overline{CoF_v}$ is calculated according to Equation (1)

$$\overline{CoF_v} = \int_{v_0^s}^{v_f^s} \frac{CoF(v_i^s)}{v_i^s} d(v_i^s) \qquad (1)$$

in which $CoF(v_i^s)$ is coefficient of friction

$$\left(\frac{FT(v_i^s)}{FN}\right)$$

measured at a sliding speed v_i^s, FN is the applied normal force acting on a testing lens under test against a standard counter surface of a standard substrate, and $FT(v_i^s)$ is a tangential force or horizontal force resulted from the sliding motion of the testing lens relative to the standard counter surface at the sliding speed v_i^s which is generated by reciprocally moving the standard substrate relative to the testing lens first at an acceleration rate of 10 mm/s^2 along a path of about 25 mm and then at a deceleration rate of 10 mm/s^2 along a path of about 25 mm.

19. The method of claim 18, wherein the inspecting step is conducted by statistical sampling or conducted continuously on production line.