Claims:

1. A method for producing photochromic silicone hydrogel contact lenses, the method comprising the steps of:

(1) obtaining a mold, wherein the mold has a first mold half with a first molding surface defining the anterior surface of a contact lens and a second mold half with a second molding surface defining the posterior surface of the contact lens, wherein said first and second mold halves are configured to receive each other such that a cavity is formed between said first and second molding surfaces;

(2) introducing a polymerizable composition into the cavity, wherein the polymerizable composition comprises

(a) from 20% to 40% by weight of at least one hydrophilic (meth)acrylamido monomer

(b) from 15% to 30% by weight of at least one siloxane-containing (meth)acrylamido monomer,

(c) from 15% to 35% by weight of at least one polysiloxane vinylic crosslinker,

(d) from 0.005% to 1.0% by weight of at least one photochromic compound,

(e) from 0.3% to 1.5% by weight of at least one UV-absorbing vinylic monomer, and

(f) from 0.05% to 1.5% by weight of at least one an acyl germanium photoinitiator, relative to the total weight of the polymerizable composition, wherein said at least one acyl germanium photoinitiator is capable of initiating a free-radical polymerization under irradiation with a light source including a light in the region of 420 to 500 nm, wherein the sum of the amounts of components (a) to (e) is at least 96% by weight relative to total amount of all polymerizable components in the polymerizable composition, wherein the polymerizable composition has a curing time of 50 seconds or less as determined in photo-rheology study using a LED light source which provide a visible light with a spectral centroid of 452 nm and a total irradiance of 54 mW/cm^2, wherein the listed components and any additional components add up to 100% by weight; and

(3) irradiating the polymerizable composition in the mold for 50 seconds or less with a visible light in a region of from 420 to 500 nm, so as to form the photochromic silicone hydrogel contact lens,

wherein the formed photochromic silicone hydrogel contact lens comprises an anterior surface defined by the first molding surface and an opposite posterior surface defined by the second molding surface and is capable of undergoing reversible change from a colorless or light-colored state to a colored state upon exposure to UV or HEVL

irradiation.

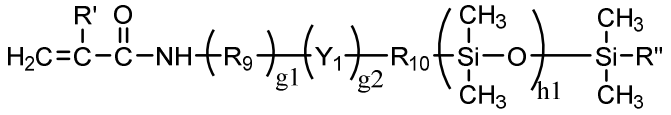
2. The method of claim 1, wherein the mold is a reusable mold, wherein the step of irradiating is performed under a spatial limitation of actinic radiation, wherein the formed UV-absorbing silicone hydrogel contact lens comprises a lens edge defined by the spatial limitation of actinic radiation.

3. The method of claim 1 or 2, wherein the polymerizable composition has a curing time of 35 second or less as determined in photo-rheology study using a LED light source which provide a visible light with a spectral centroid of 452nm and a total irradiance of 54 mW/cm^2, wherein the polymerizable composition in the mold is irradiated for 35 seconds or less.

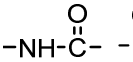
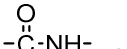
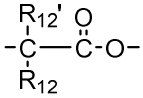
4. The method of any one of claims 1 to 3, wherein said at least one hydrophilic (meth)acrylamido monomer comprises (meth)acrylamide, N,N-dimethyl (meth)acrylamide, N-ethyl (meth)acrylamide, N,N-diethyl (meth)acrylamide, N-propyl (meth)acrylamide, N-isopropyl (meth)acrylamide, N-3-methoxypropyl (meth)acrylamide, N-2-hydroxylethyl (meth)acrylamide, N,N-bis(hydroxyethyl) (meth)acrylamide, N-3-hydroxypropyl (meth)acrylamide, N-2-hydroxypropyl (meth)acrylamide, N-2,3-dihydroxypropyl (meth)acrylamide, N-4-hydroxybutyl (meth)acrylamide, N,N-bis(2-hydroxyethyl) (meth)acrylamide, *N*-tris(hydroxymethyl) methyl (meth)acrylamide, 2-(meth)acrylamidoglycolic acid, 3-(meth)acrylamido-propionic acid, 4-(meth)acrylamido-butanoic acid, 3-(meth)acrylamido-2-methylbutanoic acid, 3-(meth)acrylamido-3-methylbutanoic acid, 2-(meth)acrylamido-2-methyl-3,3-dimethyl butanoic acid, 5-(meth)acrylamidopentanoic acid, 3-(meth)acrylamidohaxanoic acid, 4-(meth)acrylamido-3,3-dimethylhexanoic acid, (3-(meth)acrylamidophenyl)boronic acid, 3-((3-methacrylamidopropyl)dimethylammonio)-propane-1-sulfonate; 3-((3-acrylamidopropyl)dimethylammonio)propane-1-sulfonate, N-2-aminoethyl (meth)acrylamide, N-2-methylaminoethyl (meth)acrylamide, N-2-ethylaminoethyl (meth)acrylamide, N-2-dimethylaminoethyl (meth)acrylamide, N-3-aminopropyl (meth)acrylamide, N-3-methylaminopropyl (meth)acrylamide, N-3-dimethylaminopropyl (meth)acrylamide, poly(ethylene glycol)ethyl (meth)acrylamide having a number average molecular weight of up to 700, methoxy-poly(ethylene glycol)ethyl (meth)acrylamide having a number average molecular weight of up to 700, or combination thereof.

5. The method of any one of claims 1 to 4, wherein said at least one siloxane-containing (meth)acrylamido monomer comprises a (meth)acrylamido monomer containing a tris(trialkylsiloxy)silyl group or a bis(trialkylsilyloxy)alkylsilyl group and/or a a mono-

(meth)acrylamido-terminated oligo- or polysiloxane of formula (IIa)



(IIa)

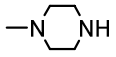
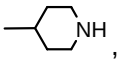
in which R' is hydrogen or methyl, R" independent of each other is C_1-C_6 alkyl, g1 and g2 independent of each other are integer of 0 or 1, h1 is an integer of 2 to 25, R_9 and R_{10} independent of each other are a substituted or unsubstituted C_1–C_{10} alkylene divalent radical, Y_1 is a linkage of , , or  in which R_{12} and R_{12}' independent of each other are C_1-C_6 alkyl.

6. The method of any one of claims 1 to 5, wherein said at least one polysiloxane vinylic crosslinker comprises: (1) a vinylic crosslinker which comprises one sole polydiorganosiloxane segment and two terminal ethylenically-unsaturated groups selected from the group consisting of (meth)acryloyloxy groups, (meth)acryloylamino groups, vinyl carbonate groups, vinylcarbamate groups; and/or (2) a chain-extended polysiloxane vinylic crosslinker which comprises at least two polydiorganosiloxane segment and a covalent linker between each pair of polydiorganosiloxane segments and two two terminal ethylenically-unsaturated groups selected from the group consisting of (meth)acryloyloxy groups, (meth)acryloylamino groups, vinyl carbonate groups, vinylcarbamate groups.

7. The method of any one of claims 1 to 6, wherein said at least one photochromic compound comprises a naphthopyran, an indeno-fused naphthopyran (i.e., indeno-naphthopyran), a heterocyclic ring-fused naphthopyrian, a benzopyran, a phenanthropyran, a quinopyran, a quinolinopyran, a fluoroanthenopyran, an anthracene-fused pyran, a tetracene-fused pyran, a spiro(benzindoline) naphthopyran, a spiro(indoline)naphthopyran, a spiro(indoline)benzopyran, a spiro(indoline)quinopyran, a spiro(indoline)pyran, a naphthoxazine, a spirobenzopyran, a spirobenzothiopyran, a naphthacenedione, a benzoxazine, a spirooxazine, a naphthoxazine, a spiro(benzindoline)naphthoxazine, a spiro(indoline)naphthoxazine, a spiro(indoline)pyrido-benzoxazine, a spiro(indoline)benzoxazine, a spiro(benzindoline) benzoxazine, a spiro(benzindoline)pyridobenzoxazine, a spiro(indoline) fluoranthenoxazine, a spiro(indoline)-quinoxazine, a spiropiperidine-naphthopyran, a piro(indoline)pyronobenzoxazinone, a benzospiropyran, a naphthospiropyran, a spirobenzoxazine-pyrrolopyridine, a spironaphthoxazine-pyrrolopyrridine, a spiro-oxazepin-benzoxazine, a spiro-oxazepin-naphthoxazine, a spiro(indoline)

benzothiazoloxazine, a spiro(indoline)benzopyrroloxazine, a spiro(indoline)quinazolino-oxazine, a spiro(indoline)-anthracenobenzoxazine, a benzofurobenzopyran, a benzothienobenzopyran, a naphthofurobenzopyran, a benzopyrano-fused naphthopyran, a spiro(isoindoline)-naphthoxazine, a spiro(isoindoline)benzoxazine, or a mixture thereof.

8. The method of claim 7, wherein said at least one photochromic compound is polymerizable and comprises an ethylenicaly-unsaturated group.

9. The method of claim 8, wherein said at least one photochromic compound is a coupling reaction product of a reactive (meth)acrylamido or (meth)acryloxy monomer having a first reactive functional group and a reactive photochromic compound have a second reactive functional group in the absence or presence of a coupling agent under coupling reaction, wherein the first reactive functional group is selected from the group consisting of –COCl, –COBr, –COOH, –NHR_{N2}, –NCO, –OH, –CHO, , , or ; wherein the second reactive functional group is selected from the group consisting of –COOH, –NHR_{N2}, , , , –NCO, –OH, –SH, –CHO, , , or , wherein R_0 is hydrogen or methyl and R_{N2} is hydrogen, a linear or branched C_1-C_{15} alkyl, cyclohexyl, cyclopentyl, a substituted or unsubstituted phenyl, or a substituted- or unsubstituted-phenyl-C_1-C_6 alkyl.

10. The method of claim 8, wherein reactive (meth)acrylamido or (meth)acryloxy monomer is selected from the group consisting of (meth)acryloyl halides of CH_2=CH─COX or CH_2=CCH_3─COX in which X= Cl or Br, N-hydroxysuccinimide ester of (meth)acrylic acid, glycidyl (meth)acrylate, isocyanato- C_2-C_6 alkyl (meth)acrylate, amino–C_2-C_6 alkyl (meth)acrylamide, C_1-C_6 alkylamino–C_2-C_6 alkyl (meth)acrylamide, (meth)acrylic acid, a C_2-C_4 alkylacrylic acid, N-2-acrylamidoglycolic acid, 3-(acryloylxy)propanoic acid, C_2-C_6 hydroxylalkyl (meth)acrylate, a C_2-C_6 hydroxyalkyl (meth)acrylamide, an azlactone-containing vinylic monomer, an aziridinyl C_1-C_{12} alkyl (meth)acrylate, acrolein, methacrolein, crotonaldehyde, and combinations thereof.

11. The method of claim 9 or 10, wherein the reactive photochromic compound comprises 3,3-bis(4-methoxyphenyl)-6,11-dimethyl-13-hydroxyethoxy-13-phenyl-3H,13H-indeno [2',3':3,4]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-6,11-dimethyl-13-(2-hydroxycarbonylethyl)carboxyethoxy-13-phenyl-3H,13H-indeno [2',3':3,4]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-6,11-dimethyl-13-hydroxy-13-phenyl-3H,13H-indeno [2',3':3,4]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-6,11-dimethyl-13-(2-hydroxycarbonylethyl)carboxy-13-phenyl-3H,13H-indeno [2',3':3,4] naphtho[1,2-

b]pyran; 3,3-bis(4-methoxyphenyl)-6,11-dimethyl-13-hydroxy-13-propyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-6,11-dimethyl-13-(2-hydroxycarbonylethyl)carboxy-13-propyl-3H,13H-indeno[2',3':3,4]-naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-10,11-dimethoxy-13-hydroxy-13-ethyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-10,11-dimethoxy-13-(2-hydroxycarbonylethyl)carboxy-13-ethyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-7-methoxy-11-phenyl-13-hydroxymethyl-13-methyl-3H,13H-indeno[2',3':3,4] naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-7-methoxy-11-phenyl-13-(2-hydroxycarbonylethyl)carboxymethyl-13-methyl-3H,13H-indeno[2',3':3,4]-naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-7-methoxy-11-phenyl-13-hydroxy-13-methyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-7-methoxy-11-phenyl-13-(2-hydroxycarbonylethyl)carboxy-13-methyl-3H,13H-indeno-[2',3':3,4]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-11-phenyl-13-hydroxy-13-methyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-11-phenyl-13-(2-hydroxycarbonylethyl)carboxy-13-methyl-3H,13H-indeno[2',3':3,4]-naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-6,7,10,11-tetramethoxy-13-hydroxy-13-ethyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-6,7,10,11-tetramethyl-13-(2-hydroxycarbonylethyl)carboxy-13-methyl-3H,13H-indeno[2',3':3,4]-naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-6,7-dimethoxy-13-hydroxy-13-ethyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3,3-bis(4-methoxyphenyl)-11-(4-(4,5-diphenyl-1H-imidazol-2-yl)phenyl-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-6-methoxy-7-(3-hydroxymethylenepiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1.2-b]pyran; 3,3-di(4-methoxyphenyl)-6-methoxy-7-(3-(2-hydroxycarbonylethyl)-carboxymethylenepiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1.2-b]pyran; 3,3-di(4-methoxyphenyl)-6,7-dimethoxy-13-hydroxy-13-butyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-6,11,13-trimethyl-13-(2-(2-hydroxyethoxy)-ethoxy)-indeno[2,1-f]naptho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-6,11,13-trimethyl-13-(2-(2-(2-(2-hydroxyethoxy)ethoxy)ethoxy)ethoxy)-indeno[2,1-f]naptho[1,2-b]pyran; 3,3-diphenyl-13-hydroxy-13-(2-oxo-2-ethoxyethyl)-1H-indeno[2,1-f]naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-6,11-dimethyl-13-hydroxy-13-(2-oxo-2-ethoxyethyl)-1H-indeno[2,1-f]naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-6,11-dimethyl-13-butyl-13-hydroxy-indeno[2,1-f]naphtho[1,2-b]pyran; 3,3-bis(4-hydroxyphenyl)-7-methoxy-11-phenyl-13,13-diethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3,3-bis(4-hydroxyphenyl)-7-methoxy-11-phenyl-13,13-dipropyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3,3-

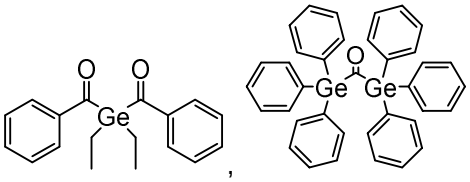
bis(4-hydroxyphenyl)-7-methoxy-11-phenyl-13-carbomethoxy-13-methyl-3H,13H-indeno[2',3':3,4] naphtho[1,2-b]pyran; 3,3-diphenyl-6,7-dimethoxy-13-methyl-13-methyl-13-hydroxyethoxy-ethoxyethoxy-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3,3-diphenyl-6,7,10,11-tetramethoxy-13-ethyl-13-methyl-13-hydroxyethoxyethoxy-3H,13H-indeno[2',3':3,4]naphtho [1,2-b]pyran; 6,7-dimthoxy-2,2-diphenyl-13-hydroxy-13-butyl-2H,13H-indeno[1',2':4,3] naphtho[1,2-b]pyran; 6,7-dimthoxy-2,2-diphenyl-13-hydroxy-13-methyl-2H,13H-indeno[1',2':4,3]naphtho[1,2-b]pyran; 6,7-dimthoxy-2,2-diphenyl-13-hydroxy-2H,13H-indeno[1',2':4,3]naphtho[1,2-b]pyran; 3-(4-allyloxyphenyl)-3-(4-morpholinophenyl)-7-methoxy-11-phenyl-13,13-dimethy-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-(4-fluorophenyl)-3-(4-butoxyphenyl)-10-(piperazin-1-yl)-6-trifluoromethyl-13,13-dimethyl-3H,13H-indeno[2',3':3:4]naphtho[1,2-b]pyran; 3-(4-fluorophenyl)-3-(4-butoxyphenyl)-10-(4-hydroxybenzamido)-6-trifluoromethyl-13,13-dimethyl-3H,13H-indeno[2',3':3:4]naphtho[1,2-b]pyran; 3-(4-fluorophenyl)-3-(4-butoxyphenyl)-10-vinyl-6-trifluoromethyl-13,13-dimethyl-3H,13H-indeno[2',3':3:4]naphtho[1,2-b]pyran; 3-(4-fluorophenyl)-3-(4-butoxyphenyl)-10-(carboxylic acid)-6-trifluoromethyl-13,13-dimethyl-3H,13H-indeno[2',3':3:4]naphtho[1,2-b]pyran; 3-(4-fluorophenyl)-3-(4-methoxyphenyl)-6-methoxy-7-(4-hydroxypiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-(4-fluorophenyl)-3-(4-methoxyphenyl)-6-methoxy-7-(4-(2-hydroxycarbonylethyl) carboxypiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-(4-fluorophenyl)-3-(4-morpholinophenyl)-6-methoxy-7-(4-hydroxypiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1.2-b]pyran; 3-(4-fluorophenyl)-3-(4-morpholinophenyl)-6-methoxy-7-(4-(2-hydroxycarbonylethyl) carboxypiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4] naphtho[1.2-b]pyran; 3-(4-hydroxyethoxyphenyl)-3-(4-methoxyphenyl)-11-(4-(N,N-dimethylamino)phenyl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(2,4-dimethoxyphenyl)-phenyl-6,11-dimethoxy-13-methyl-13-methyl-13-hydroxyethoxyethoxyethoxy-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(3-methyl-4-methoxyphenyl)-13-hydroxy-indeno[2,1-f]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(4-morpholinophenyl)-6,7,10,11-tetramethoxy-13-hydroxy-13-ethyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(4-morpholinophenyl)-6,7,10,11-tetramethoxy-13-hydroxy-13-butyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(4-morpholinophenyl)-6,7-dimethoxy-13-hydroxy-13-ethyl-3H,13H-indeno [2,1-f]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(4-morpholinophenyl)-6,7-dimethoxy-13-hydroxy-13-methyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3-(4-

methoxyphenyl)-3-(4-morpholinophenyl)-13-oxo-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-phenyl-6-methoxy-7-mprphlino-13-methyl-13-methyl-13-hydroxyethoxyethoxyethoxy-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-phenyl-6,11-dimethoxy-13-methyl-13-methyl-13-hydroxyethoxy-ethoxy-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 2-(4-methoxyphenyl)-2-(4-morpholinophenyl)-5-hydroxy-6-carboethoxy-2H-naphtho[1,2-b] pyran; 3-(4-morpholinophenyl)-3-phenyl-6,7-dimethoxy-13-hydroxy-13-ethyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3-(4-morpholinophenyl)-3-phenyl-6,7-dimethoxy-13-hydroxy-13-butyl-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3-(4-morpholinophenyl)-3-phenyl-6,7-dimethoxy-13-oxo-3H,13H-indeno[2,1-f]naphtho[1,2-b]pyran; 3-phenyl-3-(4-hydroxyethoxyphenyl)-6-methoxy-7-morpholino-13,13-dimethyl-3H,13H-indeno-[2',3':3,4] naphtho[1,2-b]pyran; 3-phenyl-3-(4-(2-hydroxycarbonylethyl)carboxyethoxy-phenyl)-6-methoxy-7-morpholino-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-(2-hydroxyethoxy)phenyl)-6-methoxy-7-piperidino-13,13-dimethy-3H,13H-indene[2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-(2-(2-hydroxycarbonylethyl)-carboxyethoxy)phenyl)-6-methoxy-7-piperidino-13,13-dimethy-3H,13H-indene[2',3':3,4] naphtho[1,2-b]pyran; 3-phenyl-3-(4-hydroxyphenyl)-6,7-dimethoxy-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[I,2-b]pyran; 3-phenyl-3-(4-hydroxyethoxy)phenyl)-6,7-dimethoxy-13,13-dimethyl-3H,13H-indeno[2',3':3,4]-naphtho[1,2-b]pyran; 3-phenyl-3-(4-(2-hydroxycarbonylethyl)carboxyethoxy)phenyl)-6,7-dimethoxy-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-(2-hydroxycarbonylethyl)carboxy-phenyl)-6,7-dimethoxy-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[I,2-b]pyran; 3-phenyl-3-(4-(4-(2-hydroxyethyl)piperazin-1-yl)phenyl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-(4-(2-(2-hydroxycarbonylethyl)-carboxyethyl)piperazin-1-yl)phenyl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho-[1,2-b]pyran; 3-phenyl-3-(4-methoxyphenyl)-6-methoxy-7-piperazinyl-13,13-dimethyl-3H,13H-indene[2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-methoxyphenyl)-6-methoxy-7-(3-hydroxymethylenepiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno [2',3":3.4]naphtho[1.2-b]pyran; 3-phenyl-3-(4-methoxyphenyl)-6-methoxy-7-(3-(2-hydroxycarbonylethyl) carboxymethylenepiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3":3.4]naphtho[1.2-b]pyran; 3-phenyl-3-(4-methoxyphenyl)-6-methoxy-7-(4-hydroxypipendin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho-[1,2-b]pyran; 3-phenyl-3-(4-methoxyphenyl)-6-methoxy-7-(4-(2-hydroxycarbonylethyl)-carboxypipendin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-(4-methoxyphenyl-piperazin-1-yl)phenyl)-13,13-dimethyl-6-methoxy-7-

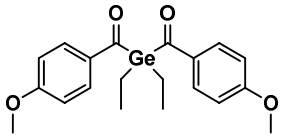
hydroxy-indeno [2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-(4-methoxyphenyl-piperazin-1-yl)phenyl)-13,13-dimethyl-6-methoxy-7-(2-hydroxy-2-methyl-3-butyn-4-yl)-indeno[2',3':3,4]naphtho [1,2-b]pyran; 3-phenyl-3-(4-morpholinophenyl)-6-methoxy-7-(3-hydroxymethylene-piperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho-[1,2-b]pyran; 3-phenyl-3-(4-morpholinophenyl)-6-methoxy-7-(3-(2-hydroxycarbonyl-ethyl)carboxymethylene-piperidin-1-yl)-13,13-dimethyl-3H,13H-indeno [2',3':3.4]-naphtho[1,2-b]pyran; 3-phenyl-3-(4-morpholinophenyl)-6-methoxy-7-(3-(2-hydroxycarbonylethyl)carboxymethylene-piperidin-1-yl)-13,13-dimethyl-3H,13H-indeno [2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-morpholinophenyl)-6-methoxy-7-(4-hydroxypiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1.2-b]pyran; 3-phenyl-3-(4-morpholinophenyl)-6-methoxy-7-(4-(2-hydroxycarbonylethyl)-carboxypiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4] naphtho[1.2-b]pyran; 3-phenyl-3-(4-morpholinophenyl)-6-methoxy-7-piperazinyl-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho [1.2-b]pyran; 3-phenyl-3-(4-morpholinophenyl)-6,11-dimethyl-13-hydroxy-13-(1-oxo-methoxyprop-2-yl)-1H-indeno[2,1-f]naphtho[1,2-b]pyran; 3-phenyl-3-(4-(4-phenylpiperazino)-phenyl)-6-methoxy-7-(4-hydroxypiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4] naphtho[1.2-b]pyran; 3-phenyl-3-(4-(4-phenylpiperazino)phenyl)-6-methoxy-7-(4-(2-hydroxycarbonylethyl) carboxypiperidin-1-yl)-13,13-dimethyl-3H,13H-indeno[2',3':3,4] naphtho[1.2-b]pyran; 3-phenyl-3-(4-piperazinylphenyl)-6,11-dimethoxy-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho-[1,2-b]pyran; 3-phenyl-3-(4-piperazinylphenyl)-6-methoxy-7-piperidinyl-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-(3-methylpiperazin-1-yl)phenyl)-6-methoxy-7-(decahydroisoquinolin-2-yl)-11-*tert*-butyl-13,13-dimethyl-3H,13H-indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(4-morpholinophenyl)-16-(ethoxycarnobyl)methyl-16-hydroxy-3,16-dihydrobenzofuro-[2',3':7,8] indeno[2',3':3,4]naphtho[1,2-b]pyran; 3-phenyl-3-(4-methoxyphenyl)-16-(ethoxycarnobyl)-methyl-16-hydroxy-3,16-dihydrobenzofuro [2",3":6',7']indeno-[3',2':4,3]naphtho[1,2-b]pyran; 3-phenyl-3-(4-morpholinophenyl)-16-(ethoxycarnobyl)-methyl-16-hydroxy-3,16-dihydrobenzofuro[2",3":6',7']indeno[3',2':4,3] naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-16-(ethoxycarbonyl)methyl-16-hydroxy-3,16-dihydro-benzofuro[2',3':7,8]indeno[2',3':3,4] naphtho[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-16-hydroxy-16-ethyl-16H-benzofuro[2',3':7,8] indeno[2',3':3,4]naphtho [1,2-b]pyran; 3,3-di(4-methoxyphenyl)-16-hydroxy-16H-benzofuro [2",3":6,7]indeno [3',2':4,3]naphtho-[1,2-b]pyran; 3,3-di(4-methoxyphenyl)-16-hydroxy-16-ethyl-16H-benzofuro[2",3":6,7]-indeno[3',2':4,3]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(2,3-diydrobenzofur-5-yl)-

13-hydroxy-13-methyl-indeno[2,1-f]naphtho[1,2-b]pyran; 3-(4-methoxyphenyl)-3-(2,3-dihydrobenzofur-5-yl)-6,11-difluoro-13-hydroxy-13-(1-oxo-methoxyprop-2-yl)-1H-indeno[2,1-f]naphtho[1,2-b]pyran, or a mixture thereof.

12. The method of any one of claims 1 to 11, wherein said at least one acylgermanium photoinitiator comprises any one of



,

or


13. The method of any one of claims 1 to 12, wherein the polymerizable composition comprises from 0.2% to 2.0% by weight of said at least one UV-absorbing vinylic monomer and/or said at least one UV/HEVL-absorbing vinylic monomer.

14. A photochromic silicone hydrogel contact lens obtained according to a method of any one of claims 1 to 13.

15. The photochromic silicone hydrogel contact lens of claim 14, having: an oxygen permeability of at least 40 barrers at 35^{o}C; an elastic modulus of 2.0 MPa or less at a temperature of from 22^{o}C to 28^{o}C; and/or a water content of from 15% to 70% by weight at a temperature of from 22^{o}C to 28^{o}C when fully hydrated.