Claims

1. A coating composition comprising:

(a) fine granular silica having a grain size of not larger than 30 nm;

(b) organosilicon compound components containing an epoxy group-containing organosilicon compound (b1) and tetraalkoxysilane (b2)at a mass ratio (b1/b2) of 0.25 to 4.0;

(c) water;

(d) a curing catalyst comprising a complex containing aluminum as a core metal; and

(e) a water-soluble organic solvent;

wherein said fine granular silica (a) is contained in an amount of 15 to 55 parts by mass, said water (c) is contained in an amount of 30 to 200 parts by mass, said curing catalyst (d) is contained in an amount of 0.1 to 5.0 parts by mass, and said a water-soluble organic solvent (e) in an amount of 10 to 200 parts by mass per the total amount of said fine granular silica (a) and said organosilicon compound components (b) of 100 parts by mass, and a mass ratio (c/e) of the water (c) and the water-soluble organic solvent (e) is 0.5 to 10.0.

2. A photochromic optical article comprising a photochromic optical base member and a hard coating formed on a surface of said photochromic optical base member, said hard coating being the one obtained by curing the coating composition of claim 1.

3. The photochromic optical article according to claim 2, wherein said photochromic optical base member has a photochromic coating formed on the surface of a light-transmitting member by curing a curable composition that contains a photochromic compound, and said hard coating is formed on the surface of said photochromic coating.

4. The photochromic optical article according to claim 3, wherein said photochromic coating is obtained by photo-polymerizing a curable composition that contains at least one kind of photochromic compound.

5. The photochromic optical article according to claim 3, wherein said light-transmitting member is a plastic lens, and said photochromic coating has a Vickers' hardness of 0.3 to 10 kg/mm^2.

6. The photochromic optical article according to claim 4, wherein said photochromic compound has an amino group.

7. The photochromic optical article according to claim 6, wherein said amino group has a substituent with 1 to 10 carbon atoms.

8. The photochromic optical article according to claim 7, wherein said substituent possessed by the amino group is a heterocyclic group containing a nitrogen atom constituting the amino group as a hetero atom, and the number of the hetero atom in said heterocyclic group is not larger than 4.

9. The photochromic optical article according to claim 7, wherein the amino group is a dialkylamino group.

10. The photochromic optical article according to claim 3, wherein said photochromic optical article exhibits a degree of yellow deterioration (ΔYI) of not larger than 3.5 when it is irradiated with light for 100 hours by using a xenon arc lamp of 2.5 kW as a source of light under the conditions of an irradiation intensity of 40 W/m^2 and an irradiated surface temperature of 50℃.

11. A method of producing a photochromic optical article comprising steps of:

forming a photochromic coating by applying a curable composition containing 0.1 to 10.0% by mass of a photochromic compound having an amino group onto a light-transmitting member, and curing said curable composition; and

forming a hard coating by applying the coating composition of claim 1 onto said photochromic coating and curing said coating composition.

Claims:

1. A coating composition comprising:

(a) a fine granular silica having a grain size of not larger than 30 nm;

(b) organosilicon compound components containing an epoxy group-containing organosilicon compound (b1) and tetraalkoxysilane (b2)at a mass ratio (b1/b2) of 0.25 to 4.0;

(c) water;

(d) a curing catalyst comprising a complex containing aluminum as a core metal; and

(e) a water-soluble organic solvent in an amount of 10 to 200 parts by mass per total amount of said fine granular silica (a) and said organosilicon compound components (b) of 100 parts by mass;

wherein said fine granular silica (a) is contained in an amount of 15 to 55 parts by mass, said water (c) is contained in an amount of 30 to 200 parts by mass and said curing catalyst (d) is contained in an amount of 0.1 to 5.0 parts by mass per the total amount of said fine granular silica (a) and said organosilicon compound components (b) of 100 parts by mass, and

wherein said organosilicon compound components (b) are contained in an amount of 85 to 45 parts by mass per the total amount of said fine granular silica (a) and said organosilicon compound components (b) of 100 parts by mass, and

wherein a mass ratio (c/e) of water (c) and the water-soluble organic solvent (e) is 0.5 to 10.0.

2. A photochromic optical article comprising a photochromic optical base member and a hard coating formed on a surface of. said photochromic optical base member, said hard coating being the one obtained by curing the coating composition of claim 1.

3. The photochromic optical article according to claim 2, wherein said photochromic optical base member has a photochromic coating formed on the surface of a light-transmitting member by curing a curable composition that contains a photochromic compound, and said hard coating is formed on the surface of said photochromic coating.

4. The photochromic optical article according to claim 3, wherein said photochromic coating is obtained by photo-polymerizing a curable composition that contains at least one kind of photochromic compound.

5. The photochromic optical article according to claim 3, wherein said light-transmitting member is a plastic lens, and said photochromic coating has a Vickers' hardness of 0.3 to 10 kg/mm^2.

6. The photochromic optical article according to claim 4, wherein said photochromic compound has an amino group.

7. The photochromic optical article according to claim 6, wherein said amino group has a substituent with 1 to 10 carbon atoms.

8. The photochromic optical article according to claim 7, wherein said substituent possessed by the amino group is a heterocyclic group containing a nitrogen atom constituting the amino group as a hetero atom, and the number of the hetero atom in said heterocyclic group is not larger than 4.

9. The photochromic optical article according to claim 7, wherein the amino group is a dialkylamino group.

10. The photochromic optical article according to claim 3, wherein said photochromic optical article exhibits a degree of yellow deterioration (ΔYI) of not larger than 3.5 when it is irradiated with light for 100 hours by using a xenon arc lamp of 2.5 kW as a source of light under the conditions of an irradiation intensity of 40 W/m^2 and an irradiated surface temperature of 50°C.

11. A method of producing a photochromic optical article comprising steps of:

forming a photochromic coating by applying a curable composition containing 0.1 to 10.0% by mass of a photochromic compound having an amino group onto a light-transmitting member, and curing said curable composition; and

forming a hard coating by applying the coating composition of claim 1 onto said photochromic coating and curing said coating composition.

12. A photochromic optical article prepared by the process according to claim 11.