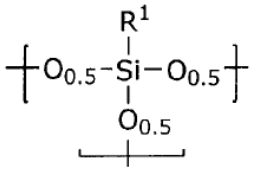
## Claims

1. A negative type photosensitive siloxane composition, comprising:

(I) a polysiloxane
which contains a repeating unit represented by the following formula (Ia):




( Ia )

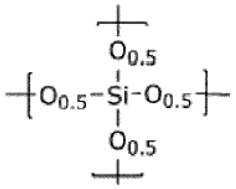
wherein

$R^1$ is hydrogen, a monovalent to trivalent, linear, branched or cyclic, saturated or unsaturated $C_{1-30}$ aliphatic hydrocarbon group, or a monovalent to trivalent $C_{6-30}$ aromatic hydrocarbon group,

in said aliphatic hydrocarbon group and said aromatic hydrocarbon group, one or more methylene groups are unsubstituted or substituted with oxy, imide or carbonyl, one or more hydrogens are unsubstituted or substituted with fluorine, hydroxy or alkoxy, or one or more carbons are unsubstituted or substituted with silicon,

when $R^1$ is divalent or trivalent, $R^1$ connects Si atoms contained in a plurality of repeating units; and

a repeating unit represented by the following formula (Ib):

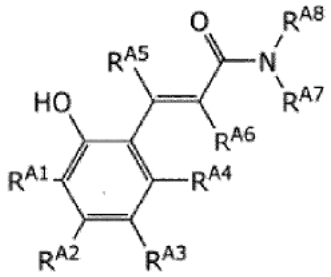



(Ib)

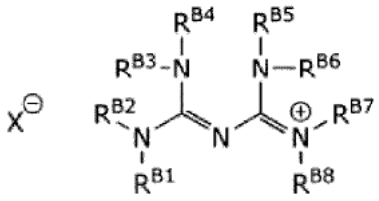
and further
which shows a spectrum in which the area intensities S1 and S2 of the peaks in the

ranges of 1100±100 cm -1 and 900±100 cm -1 assigned to Si-O and SiOH, respectively, are in a S2/S1 ratio of 0.05 to 0.15 when measured and analyzed by FT-IR,

(II) a photo base generator
represented by the following formula (PBG-A) or (PBG-B):




(PBG-A)




(PBG-B)

wherein

each of $R^{A1}$ to $R^{A6}$ is independently hydrogen, halogen, hydroxy, mercapto, sulfide, silyl, silanol, nitro, nitroso, sulfino, sulfo, sulfonate, phosphino, phosphinyl, phosphono, phosphonato, amino, ammonium, an unsubstituted or substituted $C_{1-20}$ aliphatic hydrocarbon group, an unsubstituted or substituted $C_{6-22}$ aromatic hydrocarbon group, unsubstituted or substituted $C_{1-20}$ alkoxy, or unsubstituted or substituted $C_{6-20}$ aryloxy;

each of $R^{A7}$ and $R^{A8}$ is independently $C_{1-6}$ hydroxyalkyl, or otherwise $R^{A7}$ and $R^{A8}$ are connected to each other via a $C_{2-9}$ alkylene to form a cyclic structure to which a $C_{1-6}$ hydroxyalkyl is connected;

each of $R^{B1}$ to $R^{B8}$ is independently hydrogen, an unsubstituted or substituted $C_{1-20}$ aliphatic hydrocarbon group, an unsubstituted or substituted $C_{6-22}$ aromatic

hydrocarbon group, unsubstituted or substituted $C_{1-20}$ alkoxy, or unsubstituted or substituted $C_{6-20}$ aryloxy; and

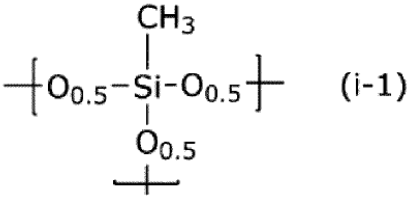
X- is a borate or carboxylate ion having an unsubstituted or substituted $C_{1-20}$ aliphatic hydrocarbon group or an unsubstituted or substituted $C_{6-22}$ aromatic hydrocarbon group; and

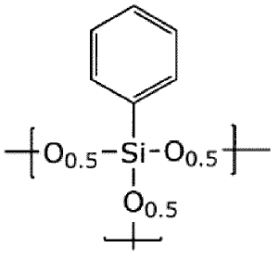
(III) a solvent.

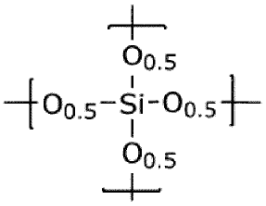
2. The composition according to claim 1, wherein said polysiloxane has silanol at the terminal or in the side chain.

3. The composition according to claim 1 or 2, wherein said $R^1$ is hydrogen, a linear, branched or cyclic $C_{1-6}$ alkyl or a $C_{6-10}$ aryl.

4. The composition according to any one of claims 1 to 3, wherein said polysiloxane comprises repeating units selected from the group consisting of (i-1), (i-2) and (i-3) in combination:


(i-1)


(i-2)


(i-3)

provided that the mixing molar ratios p1, p2 and p3 of (i-1), (i-2) and (i-3), respectively, satisfy the conditions of:

$0.4 \leq p1 \leq 0.8$,

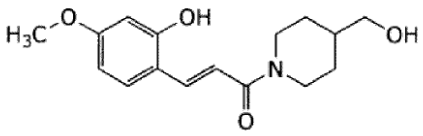
$0 \leq p2 \leq 0.4$, and

$0.2 \leq p3 \leq 0.6$.

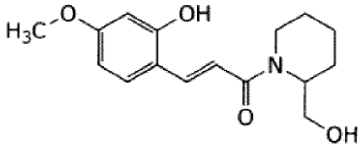
5. The composition according to any one of claims 1 to 4, wherein said polysiloxane has a mass average molecular weight of 1,000 to 10,000.

6. The composition according to any one of claims 1 to 5, wherein said polysiloxane contains the repeating unit (Ib) in a mixing ratio of 20 mol% or more based on the total amount of the repeating units.

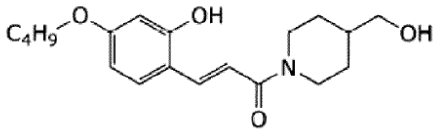
7. The composition according to any one of claims 1 to 6, wherein said photo base generator is selected from the group consisting of the following (PBG-A1) to (PBG-A8), (PBG-B1) and (PBG-B2) :



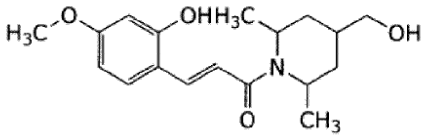

(PBG-A1)



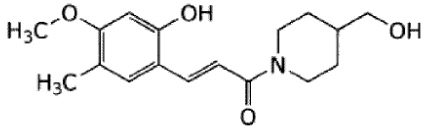

(PBG-A2)



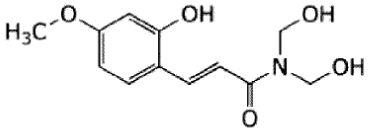
(PBG-A3)



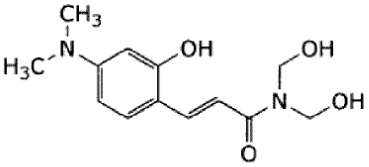
(PBG-A4)



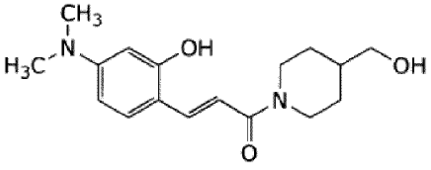
(PBG-A5)



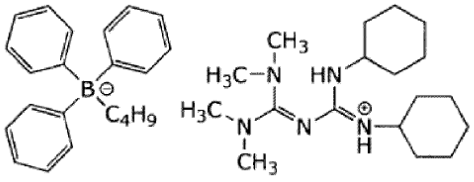
(PBG-A6)



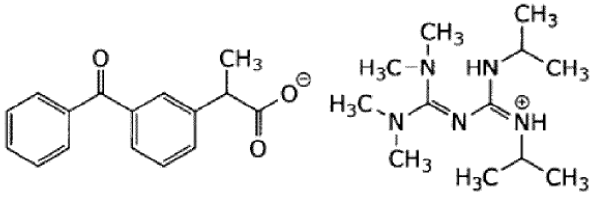
(PBG-A7)



(PBG-A8)



(PBG-B1)



(PBG-B2)

8. The composition according to any one of claims 1 to 7, wherein the amount of said photo base generator is 0.1 to 5.0 mass% based on the mass of the polysiloxane contained in the composition.

9. The composition according to any one of claims 1 to 8, wherein the solid content is 2.0 to 50 mass% based on the total mass of the composition.

10. A method for producing a cured film, comprising: coating a substrate with the composition according to any one of claims 1 to 9, exposing the substrate to light, then developing and heating the substrate.

11. The method for producing a cured film according to claim 10, wherein the heating step is carried out at a temperature of 500°C or above.

12. The method for producing a cured film according to claim 10 or 11, wherein said cured film has a thickness of 1.0 μm or more.

13. A method for producing an electronic device, including the method for producing a cured film according to any one of claims 10 to 12.