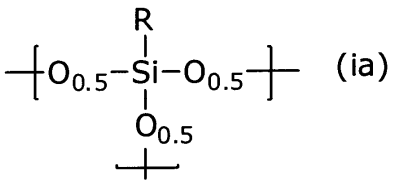
CLAIMS

[1] A photosensitive siloxane composition comprising:
a polysiloxane (Pa)
which contains a repeating unit represented by the following formula (ia):



(ia)

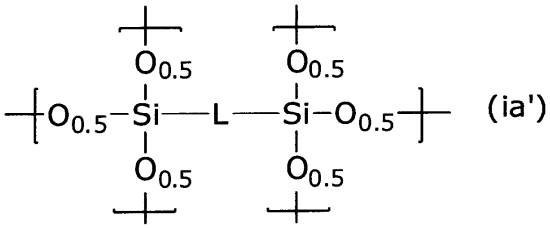
wherein

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

in said aliphatic hydrocarbon group and said aromatic hydrocarbon group, one or more methylene 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 is divalent or trivalent, R connects Si atoms contained in a plurality of repeating units, and

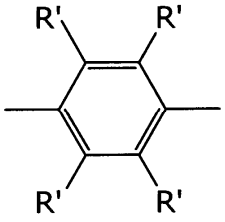
all or part of said repeating units form a structure represented by the following formula (ia'):



(ia')

wherein

L is $-(CR'_2)_n-$ or



provided that

n is an integer of 1 to 3, and

each R’ is independently hydrogen, methyl or ethyl;

a photoactive agent; and

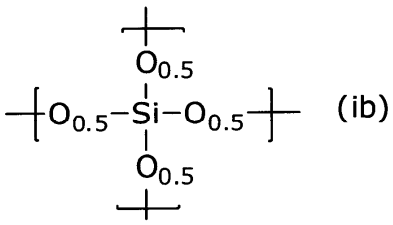
a solvent,

wherein

said polysiloxane (Pa) comprises a block in which two or more of said structures represented by the formula (ia’) are directly combined with each other, and

the number of said structures represented by the formula (ia’) included in said blocks is 10 mol% or more based on the total number of all those contained in said polysiloxane (Pa).

[2] The composition according to claim 1, wherein said polysiloxane (Pa) further contains a repeating unit represented by the following formula (ib):



(ib)

[3] The composition according to claim 1 or 2, further comprising a polysoloxane (Pb) which contains the repeating unit represented by the formula (ia) but does not contain the structure represented by the formula (ia’).

[4] The composition according to claim 3, wherein said polysoloxane (Pb) further contains the repeating unit

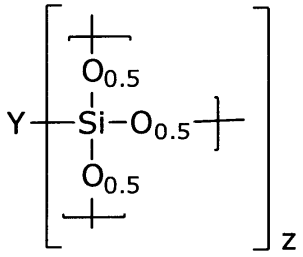
represented by said formula (ib).

[5] The composition according to any one of claims 1 to 4, wherein said polysoloxane (Pa) or (Pb) has a mass average molecular weight of 500 to 25,000.

[6] The composition according to any one of claims 1 to 5, wherein the number of said structures represented by the formula (ia') is 0.5 to 50% based on the total number of all the repeating units contained in the whole of the polysiloxanes.

[7] The composition according to any one of claims 1 to 6, wherein the summed number of both the repeating units (ia) serving as a part of (ia') in the polysiloxane (Pa) and those (ia) not connecting to another (ia) via said R is 60 mol% or more based on the total number of all the repeating units (ia) contained in the polysiloxane (Pa).

[8] The composition according to any one of claims 1 to 7, wherein the number of the structures represented by the following formula (ic):



(ic)

wherein

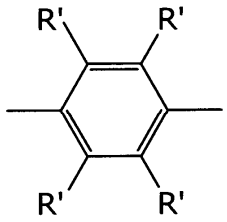
Y is a divalent or trivalent, linear, branched or cyclic, saturated or unsaturated aliphatic hydrocarbon group, or a divalent or trivalent aromatic hydrocarbon group,

in said aliphatic hydrocarbon group and said aromatic hydrocarbon group, one or more methylene are unsubstituted or substituted with oxy, imide or carbonyl, one or more hydrogens

are unsubstituted or substituted with fluorine, hydroxy or alkoxy, and one or more carbons are unsubstituted or substituted with silicon,

z is 2 or 3, and

Y is neither $-(CR'_2)_n-$ nor



provided that

n is an integer of 1 to 3, and

each R' is independently hydrogen, methyl or ethyl

is 25 mol% or less based on the total number of all the repeating units contained in the whole of the polysiloxanes.

[9] The composition according to any one of claims 1 to 8, wherein the containing ratio of said photoactive agent is 20 parts by mass or less based on the 100 parts by mass of the polysiloxane.

[10] The composition according to any one of claims 1 to 9, which is a positive type photosensitive composition.

[11] The composition according to any one of claims 1 to 9, which is a negative type photosensitive composition.

[12] A pattern forming method comprising: applying the composition according to any one of claims 1 to 11 on a substrate, image wise exposing it to light, and then developing it.

[13] The method according to claim 12, further comprising:

heating the composition after developing.

[14] The method according to claim 13, which provides a pattern after heating having a taper angle selected in the range of 15 to 80°

[15] The method according to any one of claims 12 to 14, wherein, if the applied composition is exposed to light in a 1:3 line-and-space pattern shape (5 μm line, 15 μm space) to form a pattern, the increasing ratio of the linewidth after heating for curing to that after developing is not larger than 35%.