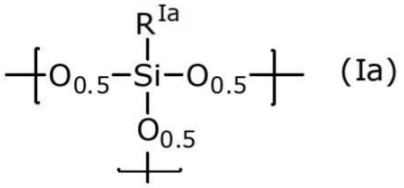
Patent Claims

1. A gate insulating film forming composition comprising:
(I) a polysiloxane,
(II) barium titanate, and
(III) a solvent,
wherein the content of the barium titanate (II) is 30 to 80 mass % based on the total mass of the polysiloxane (I) and the barium titanate (II).

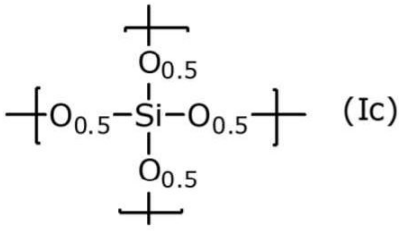
2. The composition according to claim 1, wherein the polysiloxane comprises a repeating unit represented by the following formula (Ia):



(Ia)

(wherein,
R^{Ia} is selected from the group consisting of methyl, ethyl, n-propyl, n-butyl, n-hexyl, decyl, phenyl, trifluoromethyl, and 3,3,3-trifluoropropyl~~represents hydrogen, a C_{1-30}, linear, branched or cyclic, saturated or unsaturated, aliphatic hydrocarbon group or aromatic hydrocarbon group;~~
~~the aliphatic hydrocarbon group and the aromatic hydrocarbon group are each unsubstituted or substituted with fluorine, hydroxy or alkoxy, and~~
~~in the aliphatic hydrocarbon group and the aromatic hydrocarbon group, methylene is not replaced, or one or more methylene is replaced with oxy, imino or carbonyl, provided that R^{Ia} is not hydroxy or alkoxy~~).

3. The composition according to claim 1 or 2, wherein the polysiloxane further comprises a repeating unit represented by the formula (Ic):



(Ic)

4. The composition according to any one of claims 1 to 3, wherein the barium titanate has an average primary particle size of 10 to 200 nm.

5. The composition according to any one of claims 1 to 4, wherein the content of the barium titanate (II) is 40 to 80 mass % based on the total mass of the polysiloxane (I) and the barium titanate (II).

6. The composition according to any one of claims 1 to 5, wherein the composition further comprises a silanol condensation catalyst.

7. The composition according to any one of claims 1 to 6, wherein the composition further comprises a diazonaphthoquinone derivative.

8. The composition according to any one of claims 1 to 7, wherein the content of a dispersant is 40 mass % or less based on the total mass of the barium titanate (II).

9. A gate insulating film forming composition consists of:

(I) a polysiloxane,

(II) barium titanate,

(III) a solvent, and

(IV) an additive selected from the group consisting of a diazonaphthoquinone derivative, a silanol condensation catalyst, a silicon-containing compound and a fluorine-containing compound, in an amount of 0 to 20 mass % based on the total

mass of the polysiloxane (I) and the barium titanate (II), wherein the content of the barium titanate (II) is 30 to 80 mass % based on the total mass of the polysiloxane (I) and the barium titanate (II).

10. A method for manufacturing a gate insulating film comprising:

applying the composition according to any one of claims 1 to 9 onto a substrate to form a coating film, and

heating the formed coating film.

11. The method according to claim 10, wherein the heating of the coating film is performed at 250 to 800°C.

12. The gate insulating film manufactured by the method according to claim 10 or 11, having a relative dielectric constant of 6.0 or more.

13. A thin film transistor comprising:

a gate electrode,

a gate insulating film manufactured by the method according to claim 10 or 11,

an oxide semiconductor layer,

a source electrode, and

a drain electrode.

14. The thin film transistor according to claim 13, wherein the thin film transistor further comprises a protective film.