SUMMARY OF THE INVENTION

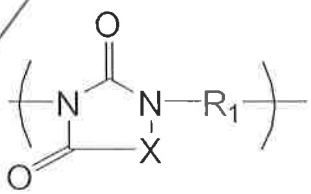
Problem to be Solved by the Invention

[0007] The light transmittance of a cured material produced from the composition disclosed in Patent Document 1 was measured at 470 nm, and was evaluated as 90% or greater. The heat resistance of the cured material was also evaluated. Although this document discloses that the transmittance at 470 nm was measured after the cured material was left in an oven at 150°C for 120 hour, the heat resistance at a temperature of 250°C or above is unclear.

[0008] Hydroxy groups are not excluded from the isocyanurate ring-containing polymer of Patent Document 1, and an oligomer compound or a polymer compound contained in the gate insulating film forming agent disclosed in Patent Document 2 has a hydroxy group introduced in a repeating unit of the compound. However, in a case where the polymer has a hydroxy group, the polymer is hygroscopic, and in applications in which insulation performance is essential, desired insulation performance may not be obtained. Furthermore, the isocyanurate ring-containing polymer of Patent Document 1 contains silicon, and thus when the polymer is used to form a film on a substrate such as silicon wafer, a fluorine gas needs to be mixed into an etching gas in the processing through reworking and a photolithography process. This may damage the substrate.

Means for Solving the Problem

[0009] A first aspect of the present invention provides a polymer having a weight-average molecular weight of 1,000 to 100,000, comprising a structural unit of Formula (1):



(1)

{where Q is a bivalent group of Formula (2) or Formula (3):

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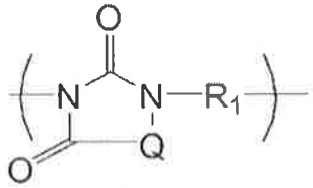
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[0002] Hydroxy groups are not excluded from the isocyanurate ring-containing polymer of Patent Document 1, and an oligomer compound or a polymer compound contained in the gate insulating film forming agent disclosed in Patent Document 2 has a hydroxy group introduced in a repeating unit of the compound. However, in a case where the polymer has a hydroxy group, the polymer is hygroscopic, and in applications in which insulation performance is essential, desired insulation performance may not be obtained. Furthermore, the isocyanurate ring-containing polymer of Patent Document 1 contains silicon, and thus when the polymer is used to form a film on a substrate such as silicon wafer, a fluorine gas needs to be mixed into an etching gas in the processing through reworking and a photolithography process. This may damage the substrate.

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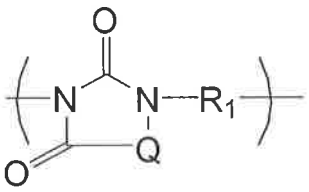


(1)

{where Q is a bivalent group of Formula (2) or Formula (3):

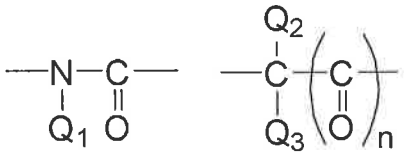
CLAIMS

1. A polymer having a weight-average molecular weight of 1,000 to 100,000, comprising a structural unit of Formula (1):



(1)

{where Q is a bivalent group of Formula (2) or Formula (3):

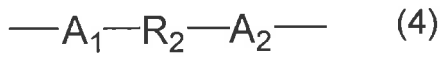


(2) (3)

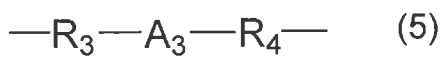
(where Q_1 is a C_{1-6} alkyl group, an allyl group, a vinyl group, an epoxy group, or a glycidyl group, each of Q_2 and Q_3 is independently a hydrogen atom, a C_{1-6} alkyl group, an allyl group, a vinyl group, an epoxy group, or a glycidyl group, and n is 0 or 1);

when Q is a bivalent group of Formula (2) or Formula (3), and n is 1, a carbonyl group composing a portion of each of Formula (2) and Formula (3) is bonded to a nitrogen atom of Formula (1);

R_1 is a $C_{4-8}$$_{1-10}$ alkylene group, ~~a C_{2-10} alkenylene group or C_{2-10} alkynylene group, a C_{6-14} arylene group, a C_{4-10} cyclic alkylene group,~~ or a group of Formula (4) or Formula (5):



(4)

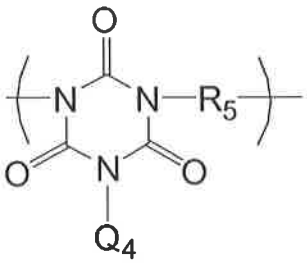


(5)

(where each of A_1, A_2, and A_3 is independently a C_{6-14} arylene group or a C_{4-10} cyclic alkylene group, R_2 is a sulfonyl group, a carbonyl group, or a C_{1-5} alkylene group, at least one hydrogen atom of the alkylene group is optionally substituted with a halogen atom, and each of R_3 and R_4 is independently a C_{1-5} alkylene group)}.

2. A polymer having a weight-average molecular weight of 1,000 to 100,000,

comprising a structural unit of Formula (6):

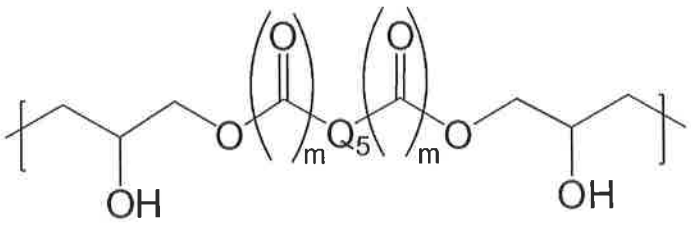


(6)

({where Q_4 is an allyl group, a vinyl group, an epoxy group, or a glycidyl group, and R_5 is ~~a bivalent organic group having a main chain consisting of a carbon atom or a main chain having a carbon atom and at least one of an oxygen atom, a nitrogen atom, and a sulfur atom)~~ a C_{4-8} bivalent hydrocarbon group or a group of Formula (7):~~.~~

~~3. The polymer according to claim 2, wherein~~

~~R_5 in Formula (6) is a C_{1-10} bivalent hydrocarbon group or a group of Formula (7):~~

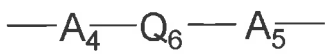


(7)

(where each of two m is independently 0 or 1, and Q_5 is a bivalent organic group)}.

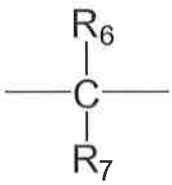
43. The polymer according to claim ~~3~~2, wherein

Q_5 in Formula (7) is a C_{6-14} arylene group, a C_{4-10} alicyclic hydrocarbon group, a C_{2-6} alkenylene group or a C_{2-6} alkynylene group, or a group of Formula (8):



(8)

{where each of A_4 and A_5 is independently a C_{6-14} arylene group or a C_{4-10} alicyclic hydrocarbon group, and Q_6 is a sulfonyl group, a carbonyl group, or an alkylene group of Formula (9):



(9)

(where each of R_6 and R_7 is independently a C_1 or C_2 alkyl group, and at least one

hydrogen atom of the alkyl group is optionally substituted with a halogen atom)}.

~~5~~4. The polymer according to claim 4~~3~~, wherein

the arylene group is a phenylene group, and

the alicyclic hydrocarbon group is a cyclohexylene group.

~~6~~5. The polymer according to claim 4~~3~~, wherein

the alkyl group is a methyl group in which at least one hydrogen atom is optionally substituted with a fluorine atom.

~~7~~6. A composition comprising the polymer according to any one of claims 1 to ~~6~~5.

~~8~~7. The composition according to claim ~~7~~6, further comprising a surfactant.

~~9~~8. The composition according to claim ~~7~~6 or ~~8~~7, further comprising a thermal acid generator.

~~10~~9. The composition according to any one of claims ~~7~~6 to ~~9~~8, further comprising a solvent.

~~11~~10. The composition according to any one of claims ~~7~~6 to ~~10~~9, wherein

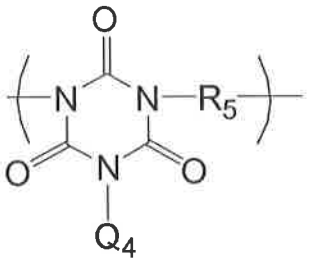
the composition is used for an adhesive, formation of an insulating film, or formation of a resist underlayer film.

~~12~~11. The composition according to claim ~~10~~9, wherein

the composition is an insulating ink.

~~13~~12. An adhesive composition comprising:

a polymer having a structural unit of Formula (6):



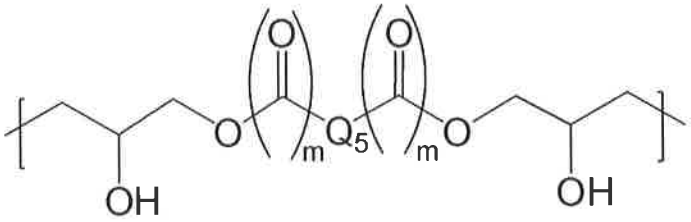
(6)

~~{~~{where Q_4 is an allyl group, a vinyl group, an epoxy group, or a glycidyl group, and R_5 is ~~a bivalent organic group having a main chain consisting of a carbon atom or a main chain having a carbon atom and at least one of an oxygen atom, a nitrogen atom, and a sulfur atom); and~~

~~an organic solvent.~~

~~14. The adhesive composition according to claim 13, wherein~~

~~R_5 in Formula (6) is~~ a $C_{4\text{-}8}$~~$_{1\text{-}10}$~~ bivalent hydrocarbon group or a group of Formula (7):



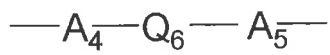
(7)

(where each of two m is independently 0 or 1, and Q_5 is a bivalent organic group)}; and

an organic solvent.

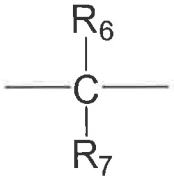
~~15~~13. The adhesive composition according to claim ~~14~~12, wherein

Q_5 in Formula (7) is a $C_{6\text{-}14}$ arylene group, a $C_{4\text{-}10}$ alicyclic hydrocarbon group, a $C_{2\text{-}6}$ alkenylene group or a $C_{2\text{-}6}$ alkynylene group, or a group of Formula (8):



(8)

{where each of A_4 and A_5 is independently a $C_{6\text{-}14}$ arylene group or a $C_{4\text{-}10}$ alicyclic hydrocarbon group, and Q_6 is a sulfonyl group, a carbonyl group, or an alkylene group of Formula (9):



(9)

(where each of R_6 and R_7 is independently a C_1 or C_2 alkyl group, and at least one

hydrogen atom of the alkyl group is optionally substituted with a halogen atom)}.

~~16~~14. The adhesive composition according to claim ~~15~~13, wherein

the arylene group is a phenylene group, and

the alicyclic hydrocarbon group is a cyclohexylene group.

~~17~~15. The adhesive composition according to claim ~~15~~13, wherein

the alkyl group is a methyl group in which at least one hydrogen atom is optionally substituted with a fluorine atom.