CLAIMS

1. A chemical amplification resist composition, comprising:

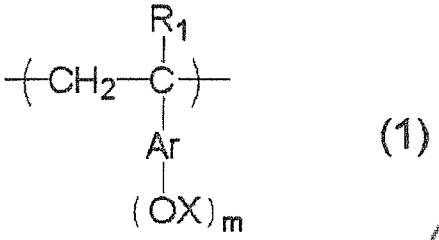
(A) a polymer compound having a structure where a hydrogen atom of a phenolic hydroxyl group is replaced by a group having a non-acid-decomposable polycyclic alicyclic hydrocarbon structure; and

(B) a compound capable of generating an acid upon irradiation with an actinic ray or radiation.

2. The chemical amplification resist composition according to claim 1, which is for electron beam or extreme-ultraviolet exposure.

3. The chemical amplification resist composition according to claim 1 or 2,

wherein the polymer compound (A) contains a repeating unit represented by the following formula (1):



(1)

wherein R_1 represents a hydrogen atom or a methyl group;

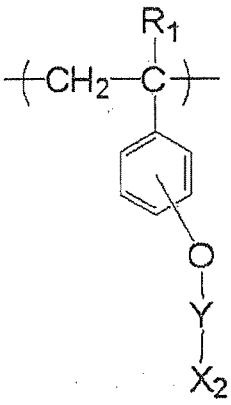
X represents a group having a non-acid-decomposable polycyclic alicyclic hydrocarbon structure;

Ar represents an aromatic ring; and

m is an integer of 1 or more.

4. The chemical amplification resist composition according to claim 3,

wherein the repeating unit represented by formula (1) is a repeating unit represented by the following formula (2) and the polymer compound (A) further contains a repeating unit represented by the following formula (3):

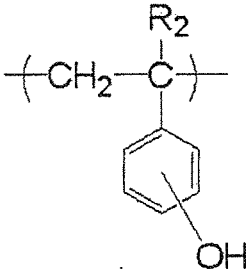


(2)

wherein R_1 represents a hydrogen atom or a methyl group;

Y represents a single bond or a divalent linking group; and

X_2 represents a non-acid-decomposable polycyclic alicyclic hydrocarbon group;



(3)

wherein R_2 represents a hydrogen atom or a methyl group.

5. The chemical amplification resist composition according to claim 4,

wherein in formula (2), Y is a divalent linking group and the divalent linking group is a carbonyl group.

6. The chemical amplification resist composition according to any one of claims 1 to 5,

wherein the compound (B) is an onium compound.

7. The chemical amplification resist composition according to any one of claims 1 to 6,

wherein a dispersity of the polymer compound (A) is from 1.0 to 1.35.

8. The chemical amplification resist composition according to any one of claims 1 to 7, which is a negative chemical amplification resist composition, further comprising:

(C) a compound having two or more hydroxymethyl groups or alkoxymethyl groups

per molecule.

9. The chemical amplification resist composition according to any one of claims 1 to 7, which is a positive chemical amplification resist composition,

wherein the polymer compound (A) further contains a repeating unit having a group capable of decomposing by an action of an acid to produce an alkali-soluble group.

10. A resist film, which is formed from the chemical amplification resist composition according to any one of claims 1 to 9.

11. A resist-coated mask blanks, which is coated with the resist film according to claim 10.

12. A resist pattern forming method, comprising:

exposing the resist film according to claim 10, so as to form an exposed film; and

developing the exposed film.

13. A resist pattern forming method, comprising:

exposing the resist-coated mask blanks according to claim 11, so as to form an exposed resist-coated mask blanks; and

developing the exposed resist-coated mask blanks.

14. The resist pattern forming method according to claim 12 or 13,

wherein the exposure is performed using an electron beam or an extreme-ultraviolet ray.

15. A photomask, which is obtained by exposing and developing the resist-coated mask blanks according to 11.

16. A polymer compound, which has a structure where a hydrogen atom of a phenolic hydroxyl group is replaced by a group having a non-acid-decomposable polycyclic alicyclic hydrocarbon structure.

17. The polymer compound according to claim 16,
wherein the group having a non-acid-decomposable polycyclic alicyclic hydrocarbon structure is a group having a non-acid-decomposable adamantane structure.

CLAIMS

1. A chemical amplification resist composition, comprising:

(A) a polymer compound having a structure where a hydrogen atom of a phenolic hydroxyl group is replaced by a group having a non-acid-decomposable polycyclic alicyclic hydrocarbon structure;

(B) a compound capable of generating an acid upon irradiation with an actinic ray or radiation; and

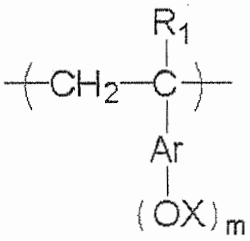
(C) a crosslinking agent.

2. The chemical amplification resist composition according to claim 1, which is for formation of negative pattern.

3. The chemical amplification resist composition according to claim 1 or 2, which is for electron beam or extreme-ultraviolet exposure.

4. The chemical amplification resist composition according to any one of claims 1 to 3,

wherein the polymer compound (A) contains a repeating unit represented by the following formula (1):



(1)

wherein R_1 represents a hydrogen atom or a methyl group;

X represents a group having a non-acid-decomposable polycyclic alicyclic hydrocarbon structure;

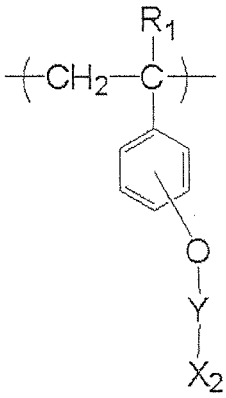
Ar represents an aromatic ring; and

m is an integer of 1 or more.

5. The chemical amplification resist composition according to claim 4,

wherein the repeating unit represented by formula (1) is a repeating unit

represented by the following formula (2) and the polymer compound (A) further contains a repeating unit represented by the following formula (3):

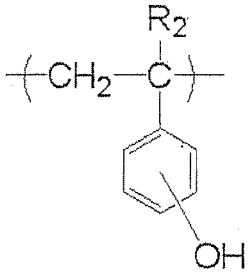


(2)

wherein R_1 represents a hydrogen atom or a methyl group;

Y represents a single bond or a divalent linking group; and

X_2 represents a non-acid-decomposable polycyclic alicyclic hydrocarbon group;



(3)

wherein R_2 represents a hydrogen atom or a methyl group.

6. The chemical amplification resist composition according to claim 5,

wherein in formula (2), Y is a divalent linking group and the divalent linking group is a carbonyl group.

7. The chemical amplification resist composition according to any one of claims 1 to 6,

wherein the compound (B) is an onium compound.

8. The chemical amplification resist composition according to any one of claims 1 to 7,

wherein a dispersity of the polymer compound (A) is from 1.0 to 1.35.

9. The chemical amplification resist composition according to any one of claims 1 to 8,

which is a negative chemical amplification resist composition, and comprises a compound having two or more hydroxymethyl groups or alkoxymethyl groups per molecule as the (C) crosslinking compound.

10. A resist film, which is formed from the chemical amplification resist composition according to any one of claims 1 to 9.

11. A resist-coated mask blanks, which is coated with the resist film according to claim 10.

12. A resist pattern forming method, comprising:
exposing the resist film according to claim 10; and
developing the exposed film.

13. A resist pattern forming method, comprising:
exposing the resist-coated mask blanks according to claim 11; and
developing the exposed resist-coated mask blanks.

14. The resist pattern forming method according to claim 12 or 13,
wherein the exposure is performed using an electron beam or an extreme-ultraviolet ray.

15. A photomask, which is obtained by exposing and developing the resist-coated mask blanks according to claim 11.