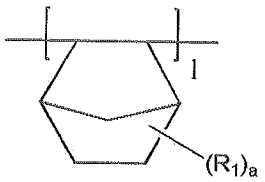
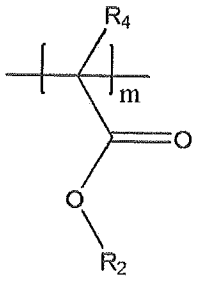
WHAT IS CLAIMED IS:

1. A copolymer comprising monomers represented by the following formulas 1 to 4:

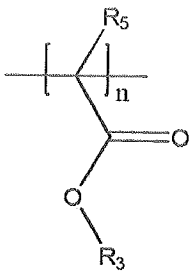
[Formula 1]



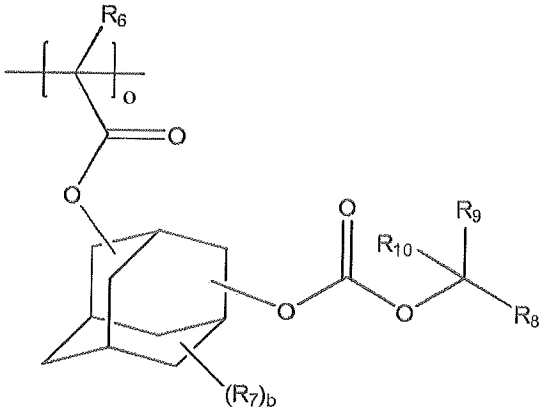
[Formula 2]



[Formula 3]



[Formula 4]



wherein in the formulas 1 to 4,

R_1 to R_{10} each independently represent any one selected from the group consisting of a halogen atom, a hydroxyl group, a carboxyl group, a nitrile group, an aldehyde group, an epoxy group, an alkyl group, a cycloalkyl group, a heterocycloalkyl group, an aryl group and a heteroaryl group;

a is an integer from 0 to 10;

b is an integer from 0 to 14; and

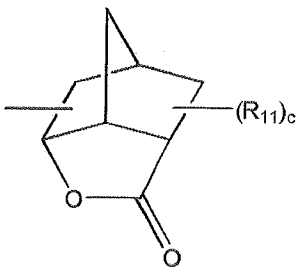
l, m, n and o are integers satisfying the relationships such as that $l+m+n+o=1$, $0.01<l/(l+m+n+o)<0.4$, $0<m/(l+m+n+o)<0.6$, $0\leq n/(l+m+n+o)<0.6$, and $0<o/(l+m+n+o)<0.4$.

2. The copolymer according to claim 1, wherein any one selected from the group consisting of R_1 to R_3 and combinations thereof is any one selected from the group consisting of an alkyl group, a cycloalkyl group, a heterocycloalkyl group, an aryl group and a heteroaryl group, each of which comprises any one selected from the group

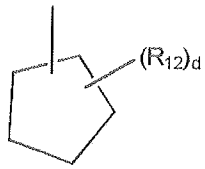
consisting of an ether group, an ester group, a carbonyl group, an acetal group, an amine group and combinations thereof, in the middle of the carbon chain.

3. The copolymer according to claim 1, wherein any one selected from the group consisting of R_1 to R_3 and combinations thereof is represented by any one chemical formulas selected from the group consisting of the following formulas 5 to 11:

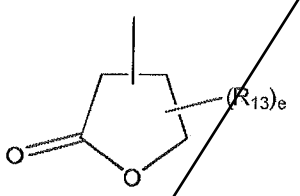
[Formula 5]



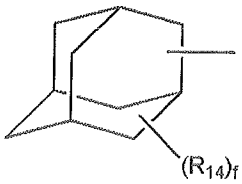
[Formula 6]



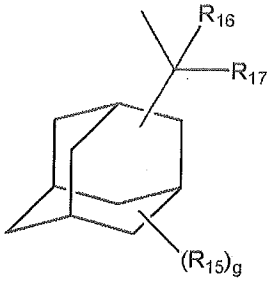
[Formula 7]



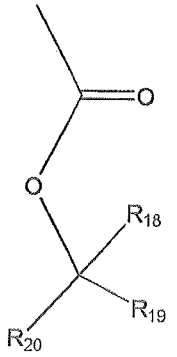
[Formula 8]



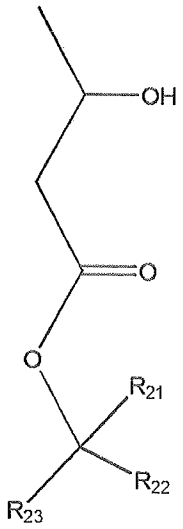
[Formula 9]



[Formula 10]



[Formula 11]



wherein in the formulas 5 to 11,

R_{11} to R_{23} each independently represent any one selected from the group consisting of a halogen atom, a hydroxyl group, a carboxyl group, a nitrile group, an aldehyde group, an epoxy group, an alkyl group, a cycloalkyl group, a heterocycloalkyl group, an aryl group and a heteroalkyl group;

c is an integer from 0 to 9;

d is an integer from 0 to 4;

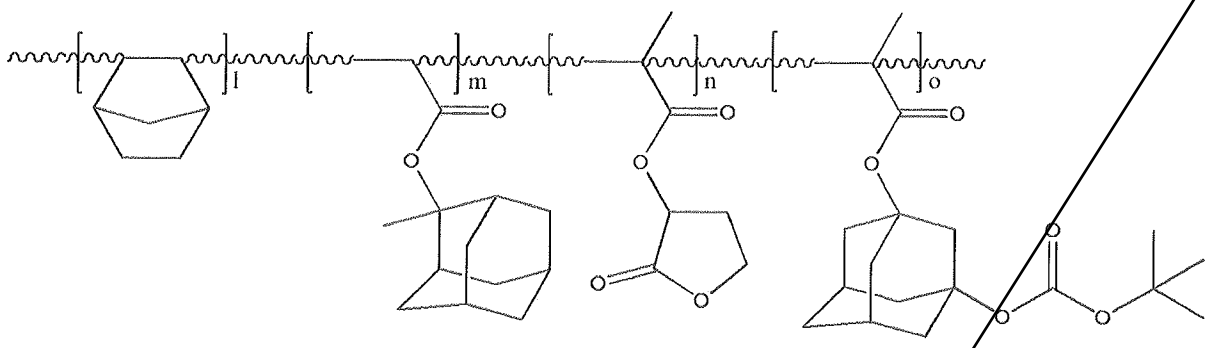
e is an integer from 0 to 4;

f is an integer from 0 to 14; and

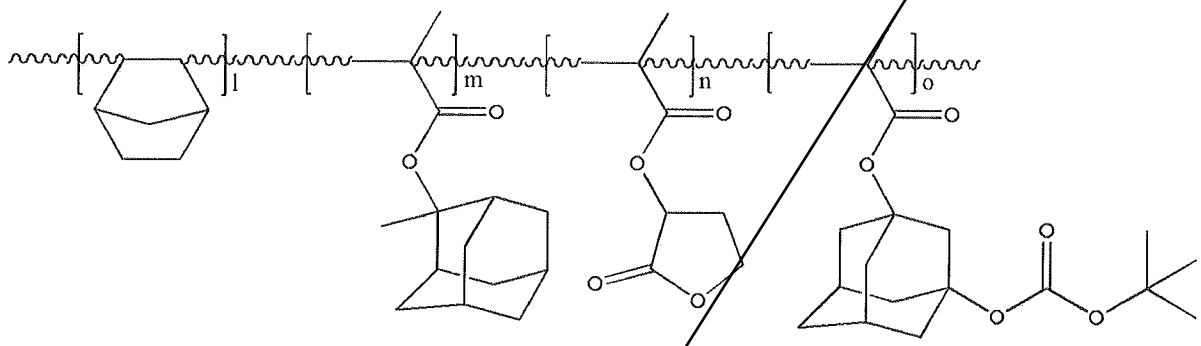
g is an integer from 0 to 14.

4. The copolymer according to claim 1, wherein the copolymer comprising the monomers represented by the formulas 1 to 4 is represented by any one formula selected from the group consisting of the following formulas 12 to 21:

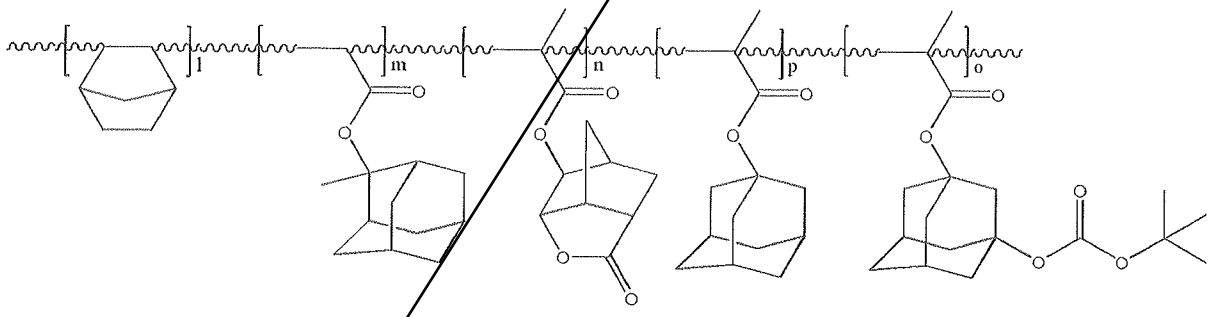
[Formula 12]



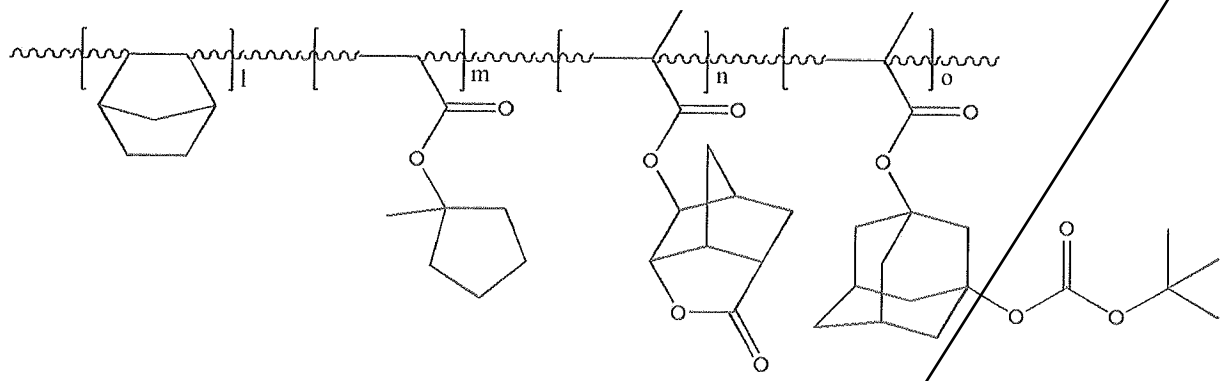
[Formula 13]



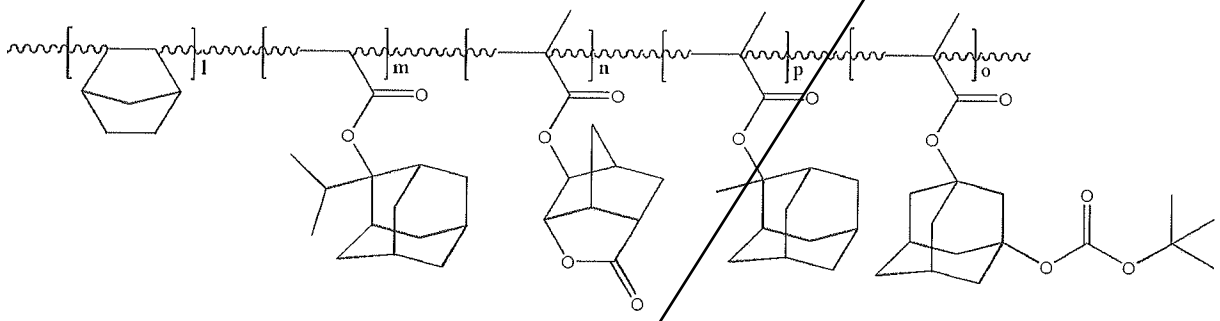
[Formula 14]



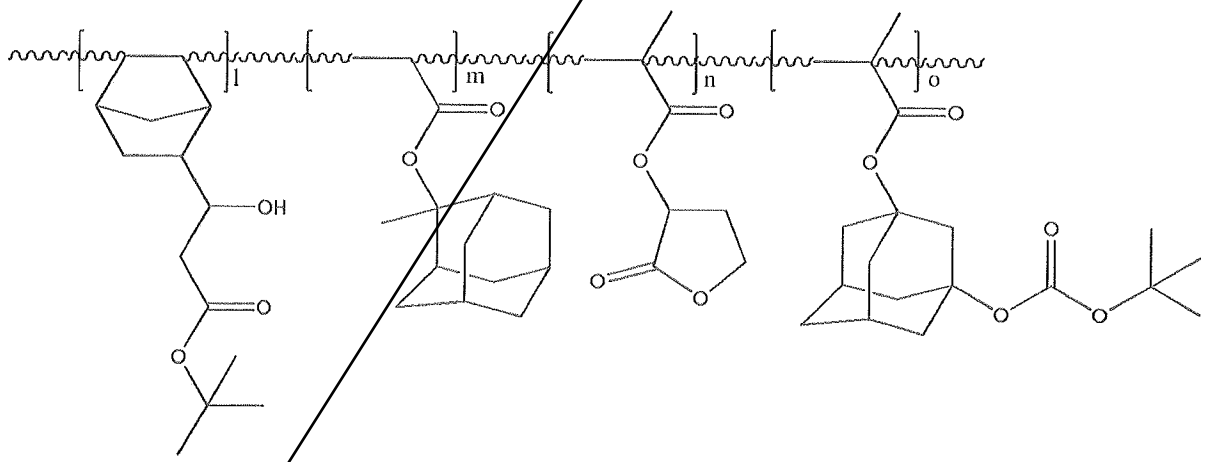
[Formula 15]



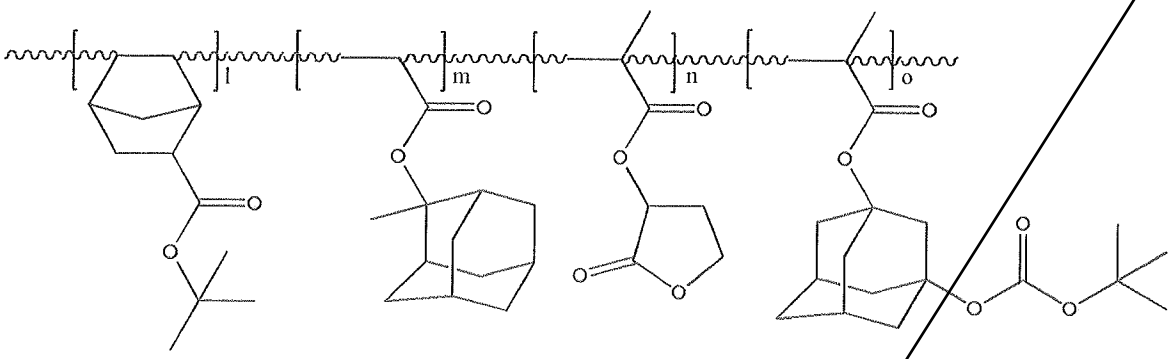
[Formula 16]



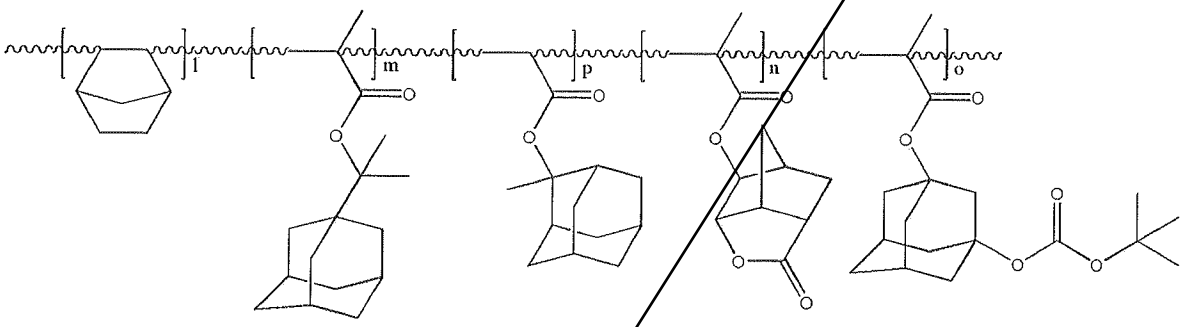
[Formula 17]



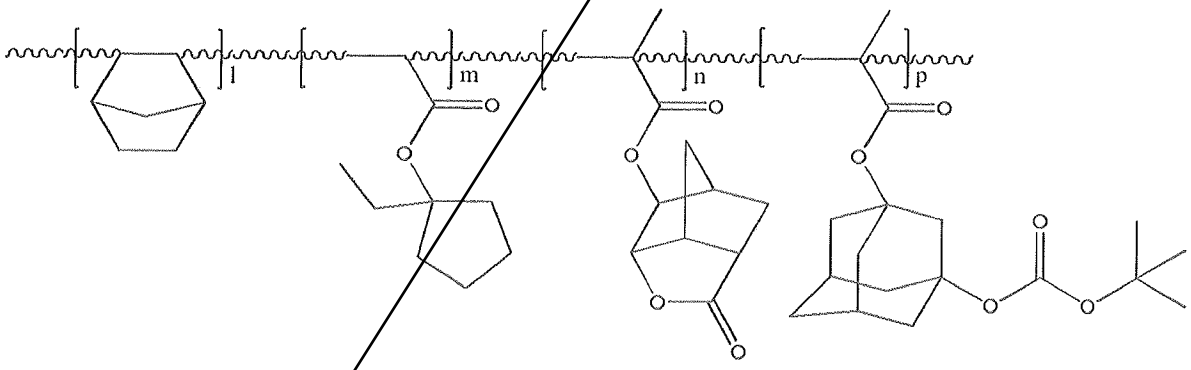
[Formula 18]



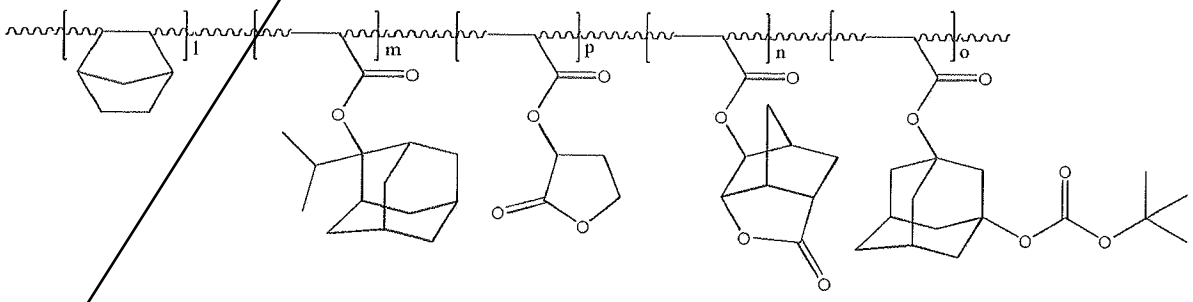
[Formula 19]



[Formula 20]



[Formula 21]



wherein in the formulas 12, 13, 15, 17, 18 and 20,

l, m, n and o are integers satisfying the relationships such as that $l+m+n+o=1$, $0.01<l/(l+m+n+o)<0.4$, $0<m/(l+m+n+o)<0.6$, $0\leq n/(l+m+n+o)<0.6$, and $0<o/(l+m+n+o)<0.4$;

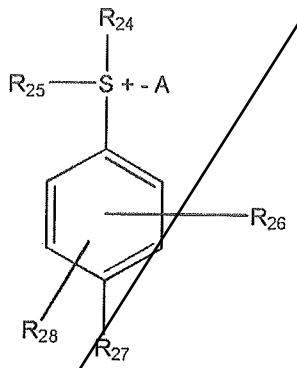
and in the formulas 14, 16, 19 and 21,

l, m, n, o and p are integers satisfying the relationships such as that $l+m+n+o+p=1$, $0.01<l/(l+m+n+o+p)<0.4$, $0<m/(l+m+n+o+p)<0.6$, $0\leq n/(l+m+n+o+p)<0.6$, $0<o/(l+m+n+o+p)<0.4$, and $0\leq p/(l+m+n+o+p)<0.6$.

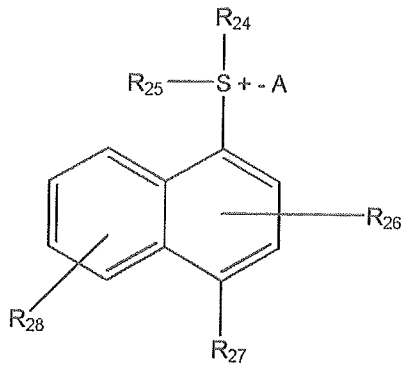
5. A photoresist composition comprising the copolymer according to any one of claims 1 to 4, an acid generator, additives, and a solvent.

6. The photoresist composition according to claim 5, wherein the acid generator is represented by any one formula selected from the group consisting of the following formula 22, formula 23 and combinations thereof:

[Formula 22]



[Formula 23]



wherein in the formulas 22 and 23,

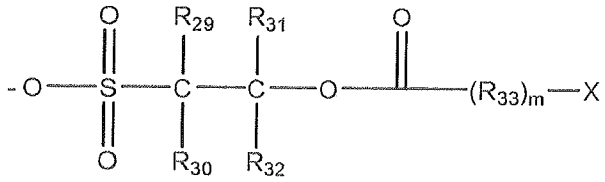
R_{24} and R_{25} each independently represent any one substituent selected from the group consisting of an alkyl group, an allyl group, a perfluoroalkyl group, a benzyl group and an aryl group;

R_{26} to R_{28} each independently represent any one substituent selected from the group consisting of a hydrogen atom, an alkyl group, a halogen group, an alkoxy group, an aryl group, a thiophenoxy group, a thioalkoxy group, and an alkoxycarbonylmethoxy group; and

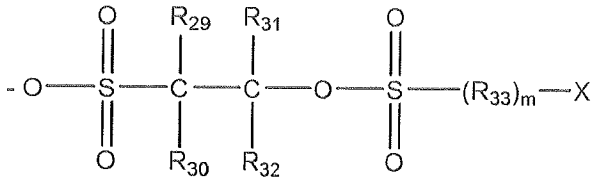
-A is an anion.

7. The photoresist composition according to claim 6, wherein the anion -A is any one selected from the group consisting of $-OSO_2CF_3$, $-OSO_2C_4F_9$, $-OSO_2C_8F_{17}$, $-N(CF_3)_2$, $-N(C_2F_5)_2$, $-N(C_4F_9)_2$, $-C(CF_3)_3$, $-C(C_2F_5)_3$, $-C(C_4F_9)_3$, a compound represented by the following formula 24, and a compound represented by the following formula 25:

[Formula 24]



[Formula 25]



wherein in the formulas 24 and 25,

X is any one selected from the group consisting of an alkyl group, a perfluoroalkyl group, a cycloalkyl group, an allyl group, a benzyl group, an aryl group and a heteroaryl group;

R_{33} is any one selected from the group consisting of an alkylene group, NR_{34}, $S(R_{35})_4$, O and combinations thereof;

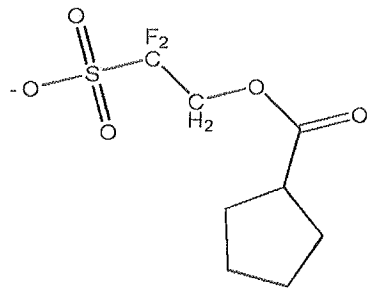
R_{29} to R_{32}, R_{34} and R_{35} each independently represent any one selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxyl group, a carboxyl group, a nitrile group, an aldehyde group, an epoxy group, an alkyl group, a cycloalkyl group, a heterocycloalkyl group, an aryl group and a heteroaryl group; and

m is an integer from 0 to 2.

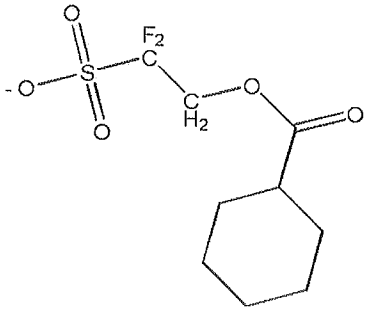
8. The photoresist composition according to claim 7, wherein the anion -A, which is any one selected from the group consisting of a compound represented by the formula 24

and a compound represented by the formula 25, is represented by any one formula selected from the group consisting of the following formulas 26 to 52:

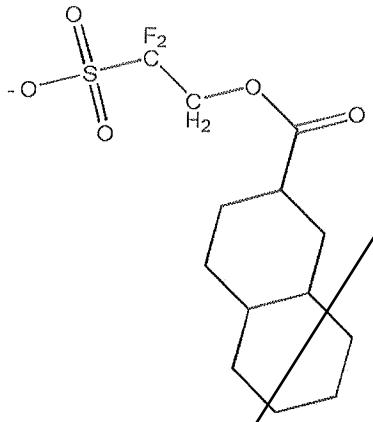
[Formula 26]



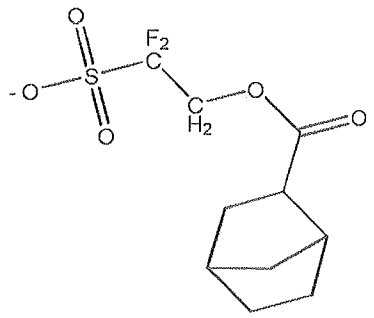
[Formula 27]



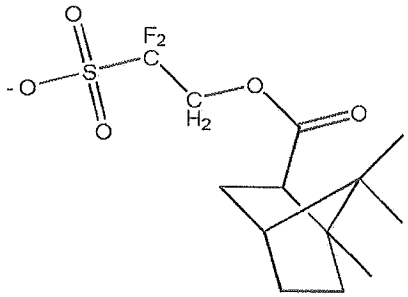
[Formula 28]



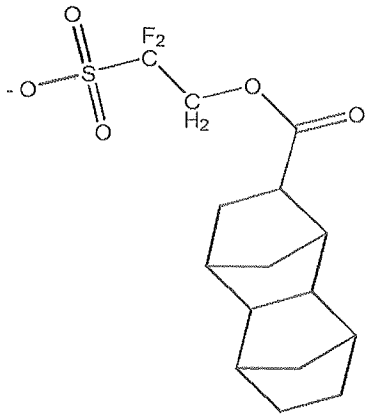
[Formula 29]



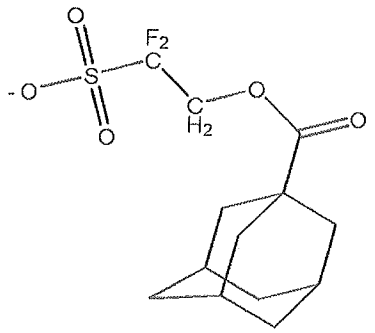
[Formula 30]



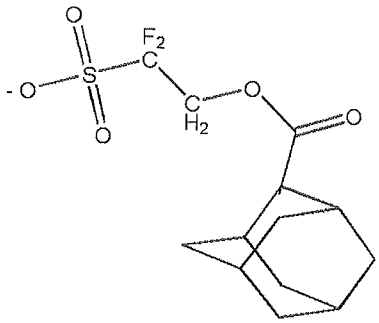
[Formula 31]



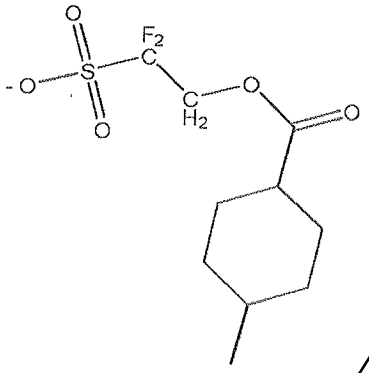
[Formula 32]



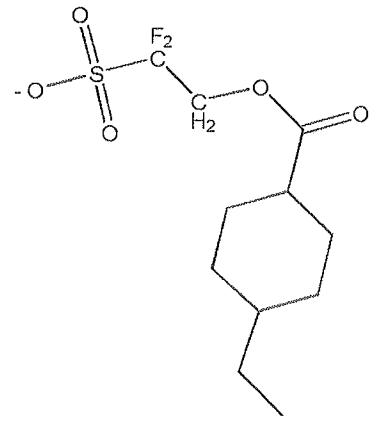
[Formula 33]



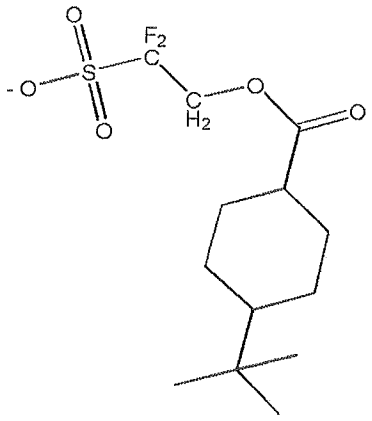
[Formula 34]



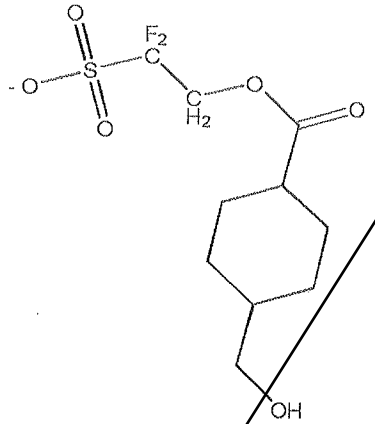
[Formula 35]



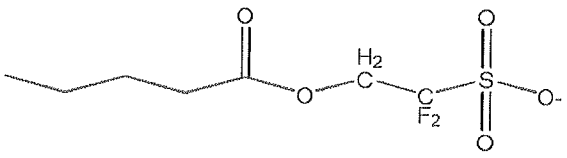
[Formula 36]



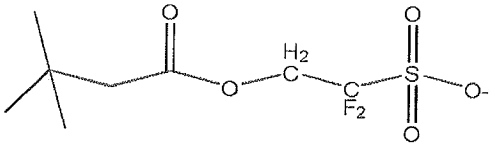
[Formula 37]



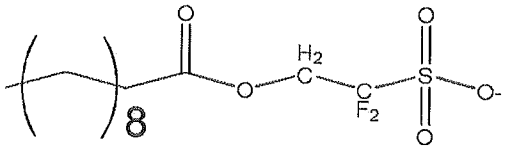
[Formula 38]



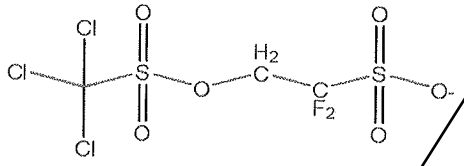
[Formula 39]



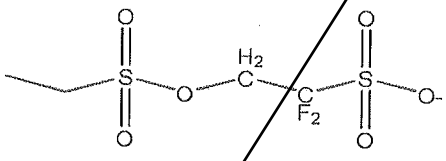
[Formula 40]



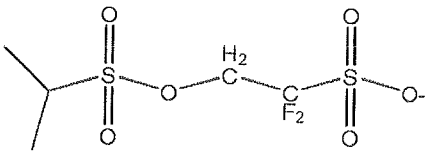
[Formula 41]



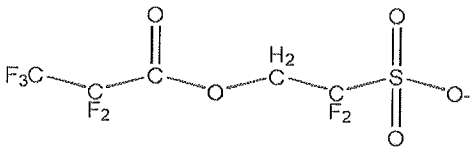
[Formula 42]



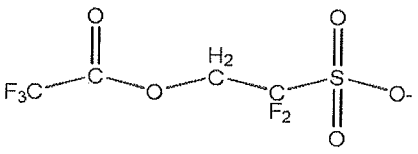
[Formula 43]



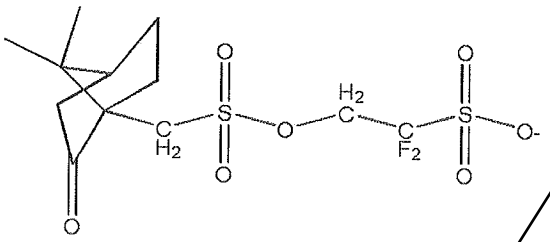
[Formula 44]



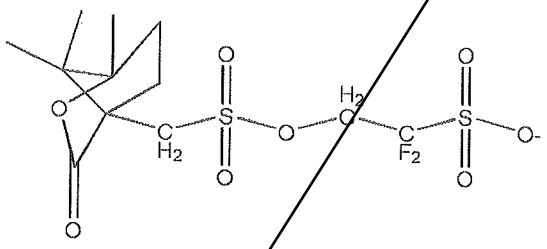
[Formula 45]



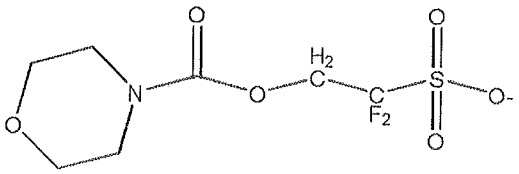
[Formula 46]



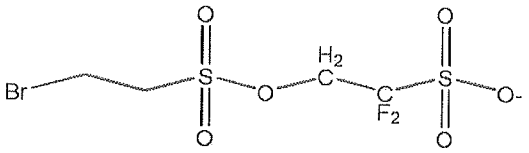
[Formula 47]



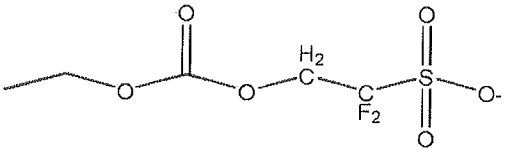
[Formula 48]



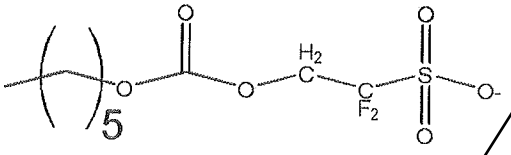
[Formula 49]



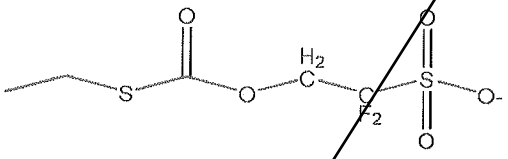
[Formula 50]



[Formula 51]



[Formula 52]



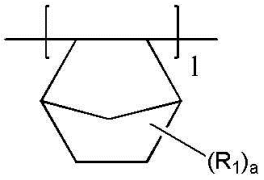
9. The photoresist composition according to claim 5, wherein the photoresist composition comprises the acid generator in an amount of 0.5 to 15 parts by weight relative to 100 parts by weight of the total solids content of the photoresist composition.

10. The photoresist composition according to claim 5, wherein the photoresist composition comprises the copolymer in an amount of 3 to 20% by weight relative to the total weight of the photoresist composition.

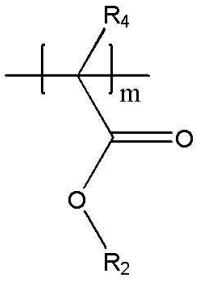
WHAT IS CLAIMED IS:

1. A copolymer comprising monomers represented by the following formulas 1 to 4:

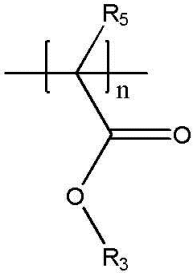
[Formula 1]



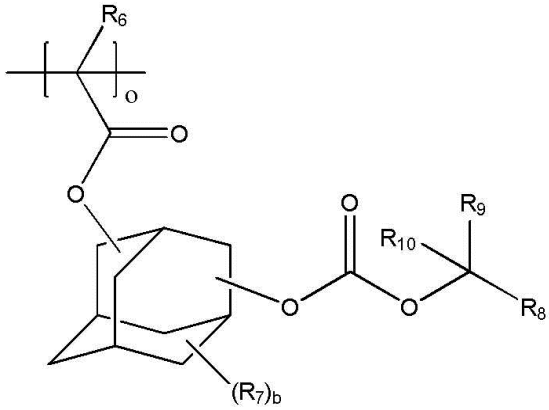
[Formula 2]



[Formula 3]



[Formula 4]



wherein in the formulas 1 to 4,

R_1, and R_4 to R_{10} each independently represent any one selected from the group consisting of a halogen atom, a hydroxyl group, a carboxyl group, a nitrile group, an aldehyde group, an epoxy group, an alkyl group, a cycloalkyl group, a heterocycloalkyl

group, an aryl group and a heteroaryl group;

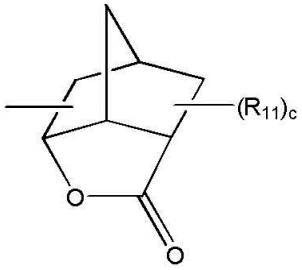
a is an integer from 0 to 10;

b is an integer from 0 to 14; and

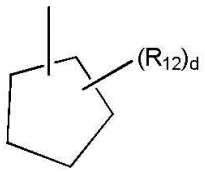
l, m, n and o satisfy the relationships such as that l+m+n+o=1, $0.01<l/(l+m+n+o)<0.4$, $0<m/(l+m+n+o)<0.6$, $0\leq n/(l+m+n+o)<0.6$, and $0<o/(l+m+n+o)<0.4$,

R_2 and R_3 each independently represent any one chemical formulas selected from the group consisting of the following formulas 5 to 11:

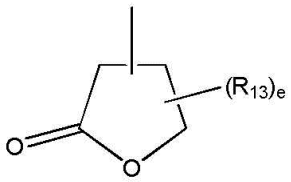
[Formula 5]



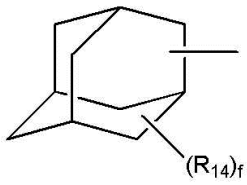
[Formula 6]



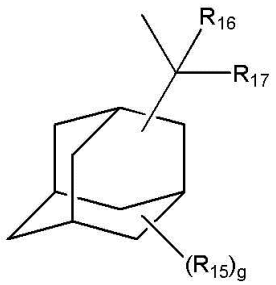
[Formula 7]



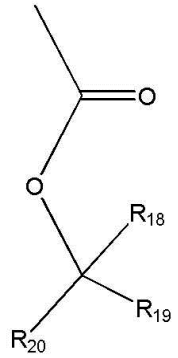
[Formula 8]



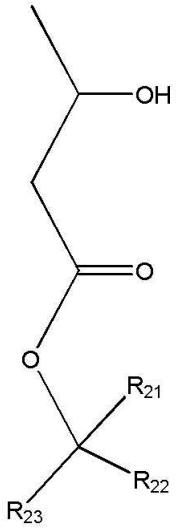
[Formula 9]



[Formula 10]



[Formula 11]



wherein in the formulas 5 to 11,

R_{11} to R_{23} each independently represent any one selected from the group consisting of a halogen atom, a hydroxyl group, a carboxyl group, a nitrile group, an aldehyde group, an epoxy group, an alkyl group, a cycloalkyl group, a heterocycloalkyl group, an aryl group and a heteroalkyl group;

c is an integer from 0 to 9;

d is an integer from 0 to 4;

e is an integer from 0 to 4;

f is an integer from 0 to 14; and

g is an integer from 0 to 14.

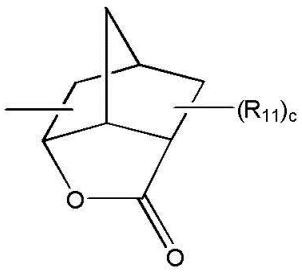
2. The copolymer according to claim 1, wherein

R_1 is any one selected from the group consisting of an alkyl group, a cycloalkyl group, a heterocycloalkyl group, an aryl group and a heteroaryl group, each of which comprises any one selected from the group consisting of an ether group, an ester group, a carbonyl group, an acetal group, an amine group and combinations thereof, in the middle of the carbon chain.

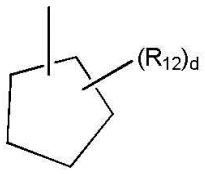
3. The copolymer according to claim 1, wherein

R_1 is represented by any one chemical formulas selected from the group consisting of the following formulas 5 to 11:

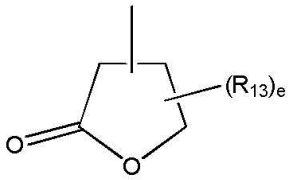
[Formula 5]



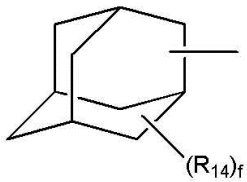
[Formula 6]



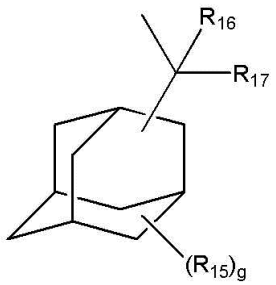
[Formula 7]



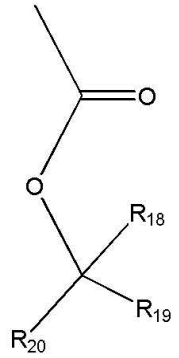
[Formula 8]



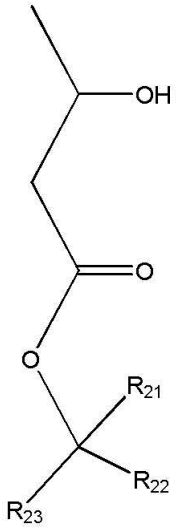
[Formula 9]



[Formula 10]



[Formula 11]



wherein in the formulas 5 to 11,

R_{11} to R_{23} each independently represent any one selected from the group consisting of a halogen atom, a hydroxyl group, a carboxyl group, a nitrile group, an aldehyde group, an epoxy group, an alkyl group, a cycloalkyl group, a heterocycloalkyl group, an aryl group and a heteroalkyl group;

c is an integer from 0 to 9;

d is an integer from 0 to 4;

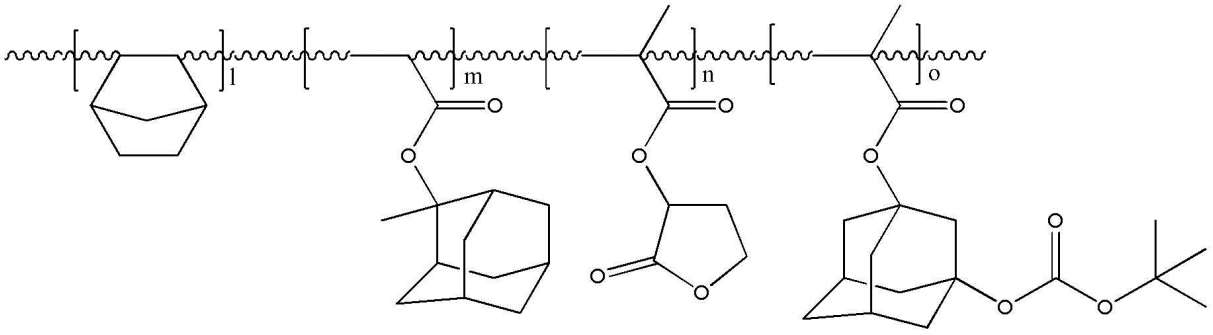
e is an integer from 0 to 4;

f is an integer from 0 to 14; and

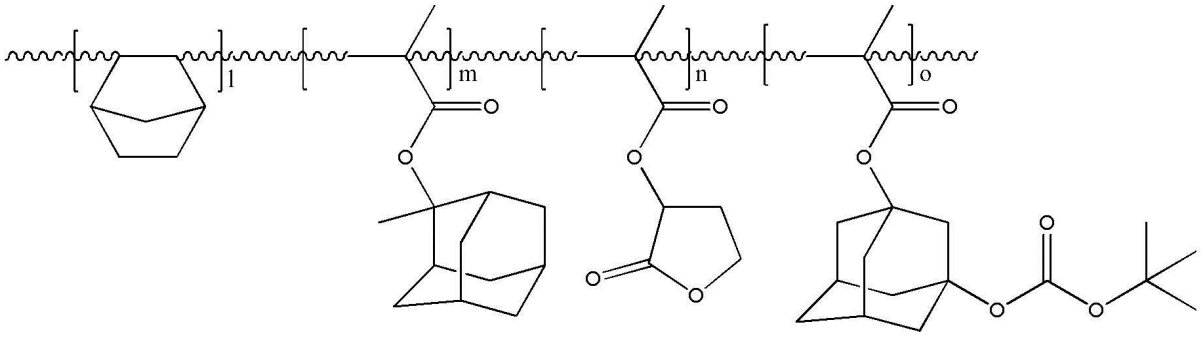
g is an integer from 0 to 14.

4. The copolymer according to claim 1, wherein the copolymer comprising the monomers represented by the formulas 1 to 4 is represented by any one formula selected from the group consisting of the following formulas 12 to 21:

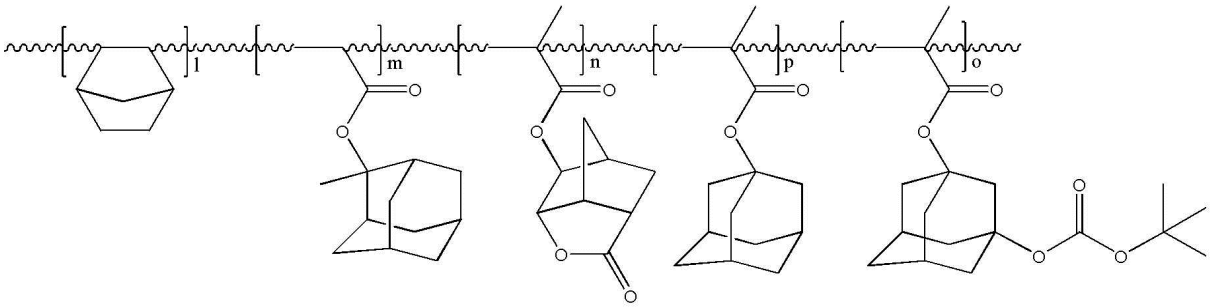
[Formula 12]



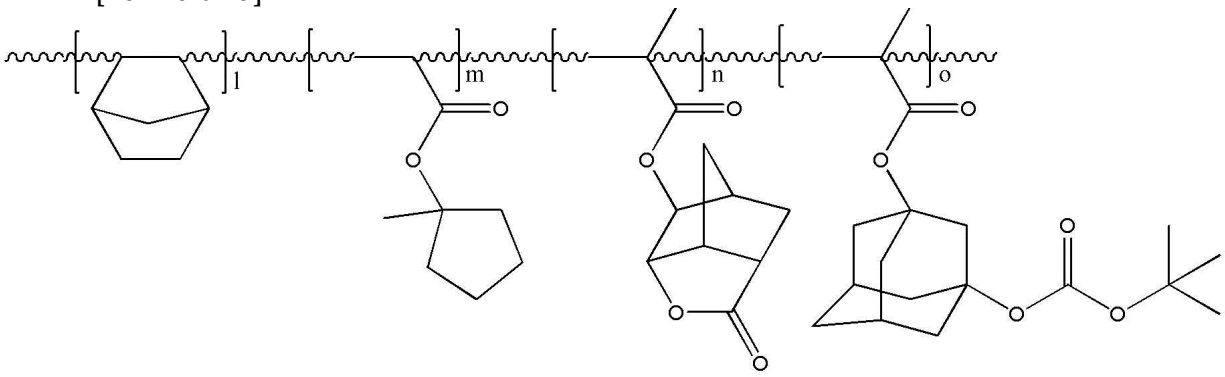
[Formula 13]



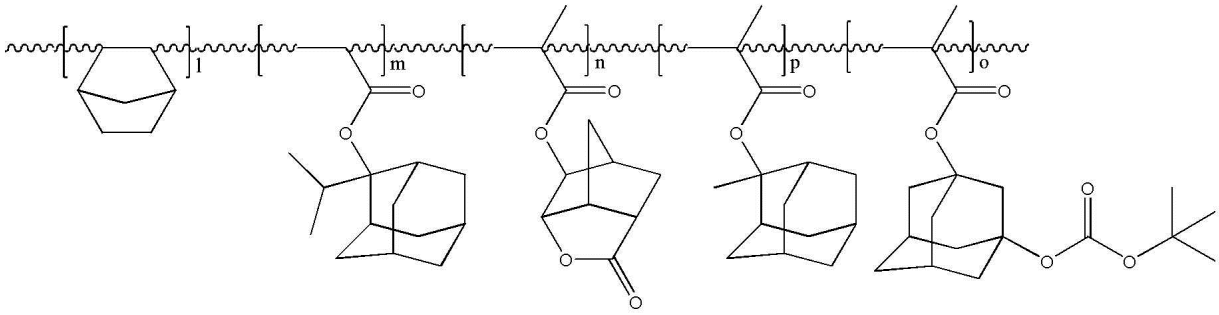
[Formula 14]



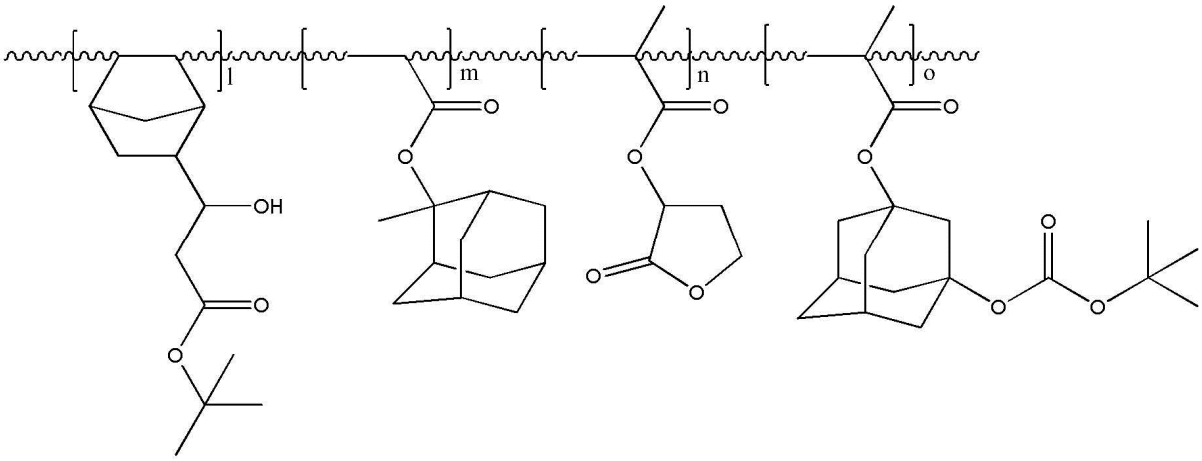
[Formula 15]



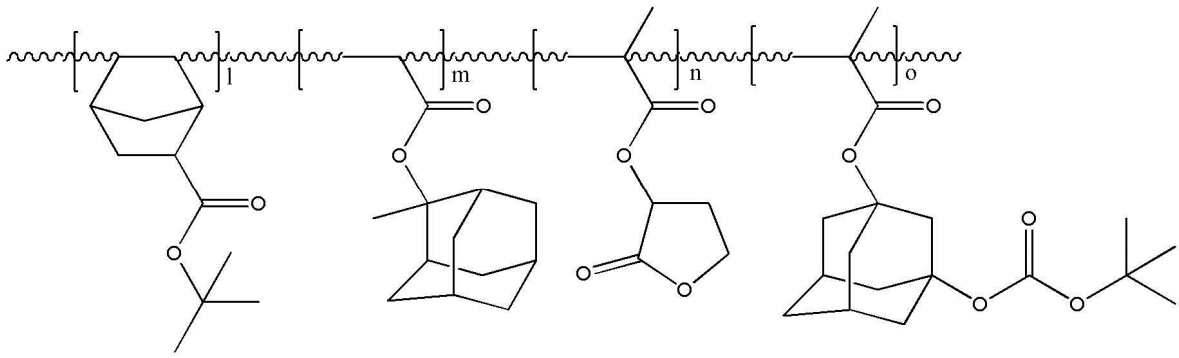
[Formula 16]



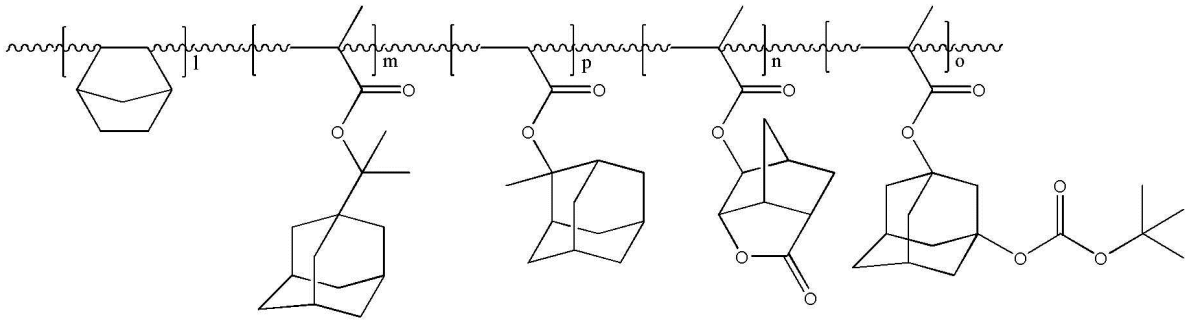
[Formula 17]



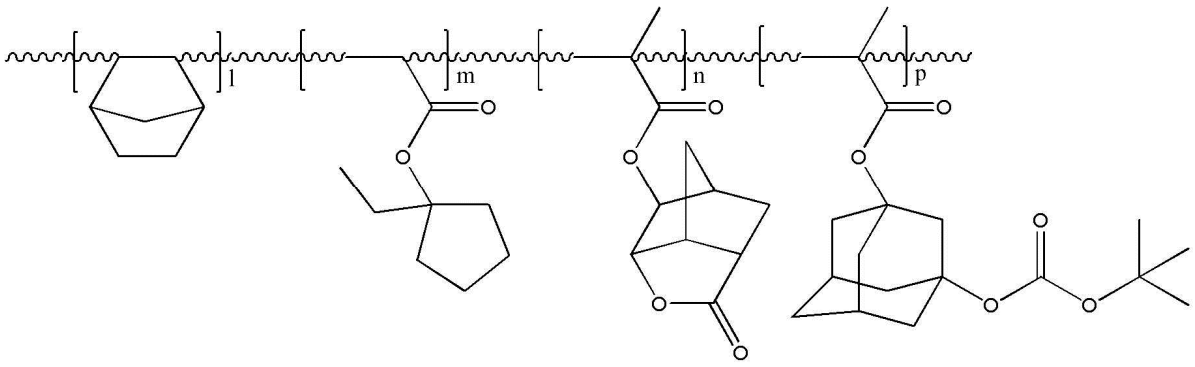
[Formula 18]



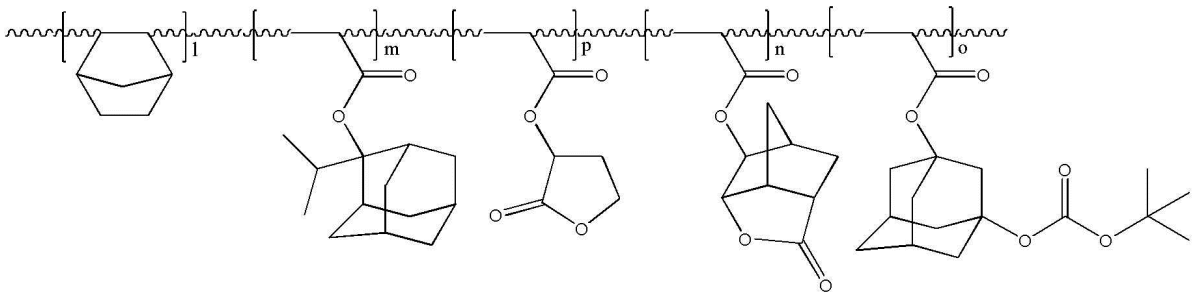
[Formula 19]



[Formula 20]



[Formula 21]



wherein in the formulas 12, 13, 15, 17, 18 and 20,

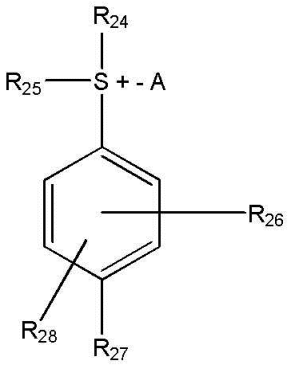
l, m, n and o are integers satisfying the relationships such as that l+m+n+o=1, $0.01<l/(l+m+n+o)<0.4$, $0<m/(l+m+n+o)<0.6$, $0\leq n/(l+m+n+o)<0.6$, and $0<o/(l+m+n+o)<0.4$; and in the formulas 14, 16, 19 and 21,

l, m, n, o and p satisfy the relationships such as that l+m+n+o+p=1, $0.01<l/(l+m+n+o+p)<0.4$, $0<m/(l+m+n+o+p)<0.6$, $0\leq n/(l+m+n+o+p)<0.6$, $0<o/(l+m+n+o+p)<0.4$, and $0\leq p/(l+m+n+o+p)<0.6$.

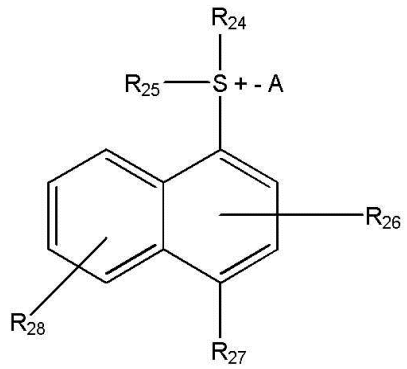
5. A photoresist composition comprising the copolymer according to any one of claims 1 to 4, an acid generator, additives, and a solvent.

6. The photoresist composition according to claim 5, wherein the acid generator is represented by any one formula selected from the group consisting of the following formula 22, formula 23 and combinations thereof:

[Formula 22]



[Formula 23]



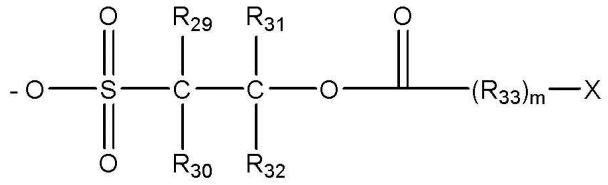
wherein in the formulas 22 and 23,

R_{24} and R_{25} each independently represent any one substituent selected from the group consisting of an alkyl group, an allyl group, a perfluoroalkyl group, a benzyl group and an aryl group;

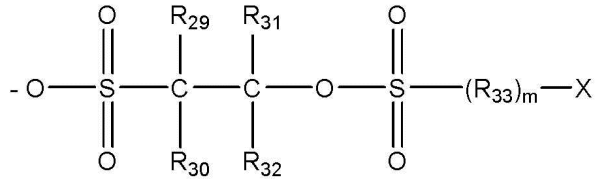
R_{26} to R_{28} each independently represent any one substituent selected from the group consisting of a hydrogen atom, an alkyl group, a halogen group, an alkoxy group, an aryl group, a thiophenoxy group, a thioalkoxy group, and an alkoxycarbonylmethoxy group; and

-A is any one anion selected from the group consisting of $-OSO_2CF_3$, $-OSO_2C_4F_9$, $-OSO_2C_8F_{17}$, $-N(CF_3)_2$, $-N(C_2F_5)_2$, $-N(C_4F_9)_2$, $-C(CF_3)_3$, $-C(C_2F_5)_3$, $-C(C_4F_9)_3$, a compound represented by the following formula 24, and a compound represented by the following formula 25:

[Formula 24]



[Formula 25]



wherein in the formulas 24 and 25,

X is any one selected from the group consisting of an alkyl group, a perfluoroalkyl group, a cycloalkyl group, an allyl group, a benzyl group, an aryl group and a heteroaryl group;

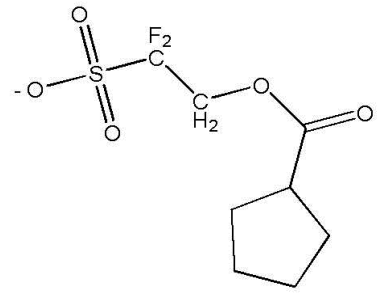
R_{33} is any one selected from the group consisting of an alkylene group, NR_{34}, $S(R_{35})_4$, O and combinations thereof;

R_{29} to R_{32}, R_{34} and R_{35} each independently represent any one selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxyl group, a carboxyl group, a nitrile group, an aldehyde group, an epoxy group, an alkyl group, a cycloalkyl group, a heterocycloalkyl group, an aryl group and a heteroaryl group; and

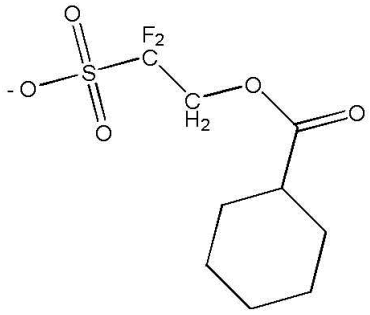
m is an integer from 0 to 2.

7. The photoresist composition according to claim 6, wherein the anion -A, which is any one selected from the group consisting of a compound represented by the formula 24 and a compound represented by the formula 25, is represented by any one formula selected from the group consisting of the following formulas 26 to 52:

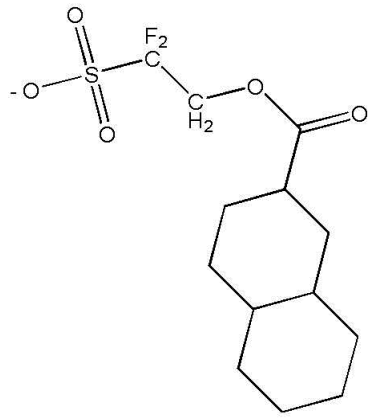
[Formula 26]



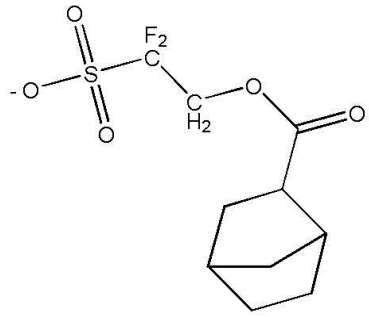
[Formula 27]



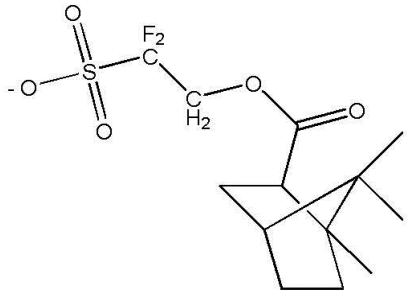
[Formula 28]



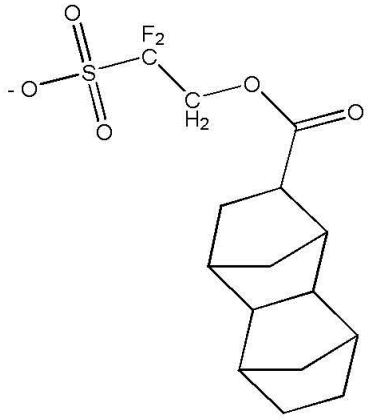
[Formula 29]



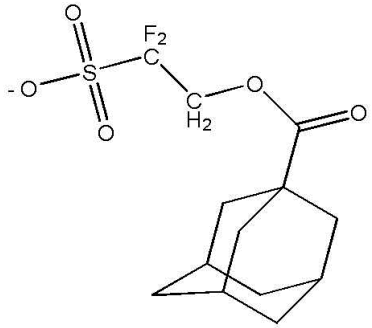
[Formula 30]



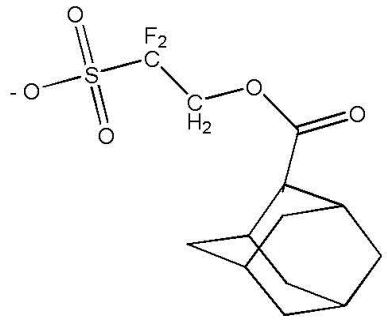
[Formula 31]



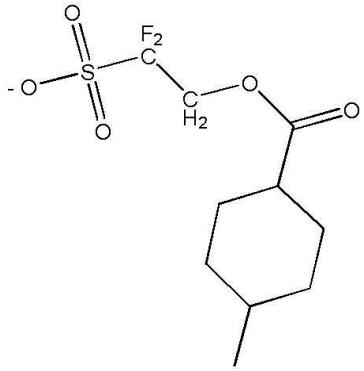
[Formula 32]



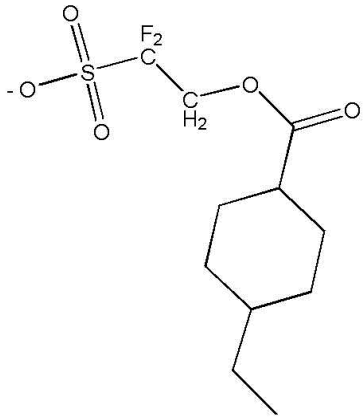
[Formula 33]



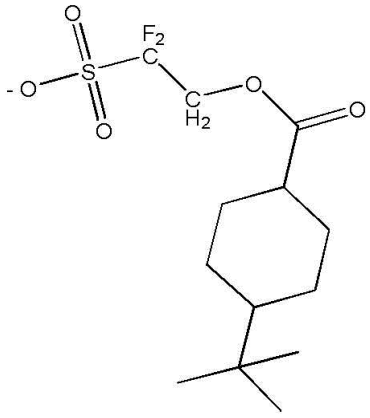
[Formula 34]



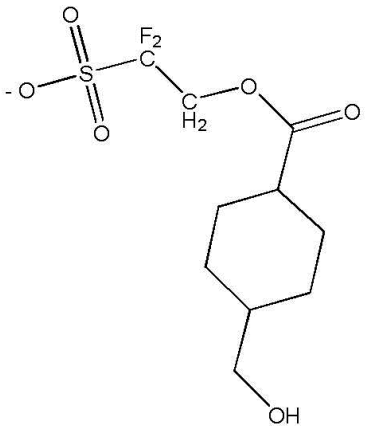
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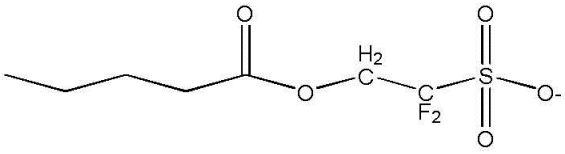
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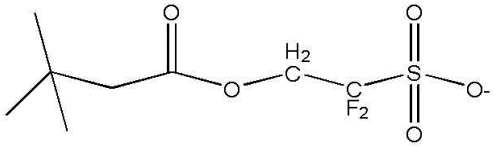
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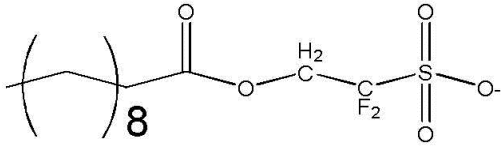
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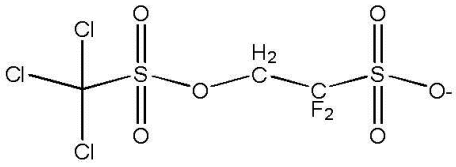
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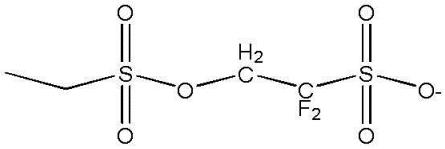
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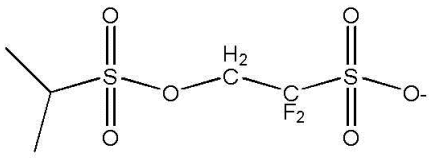
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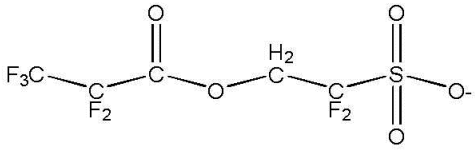
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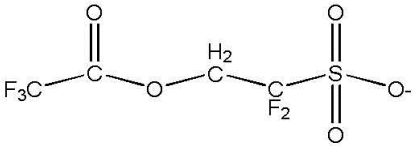
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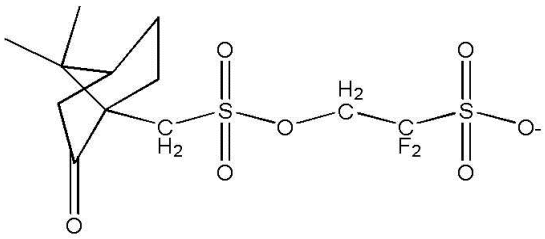
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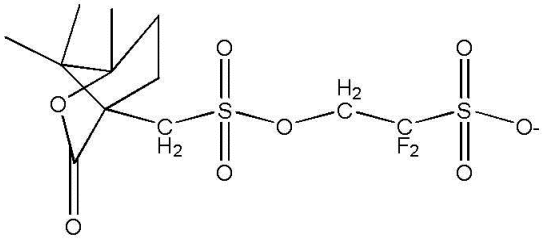
[Formula 45]



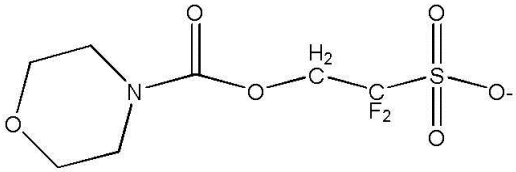
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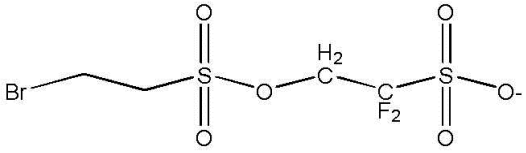
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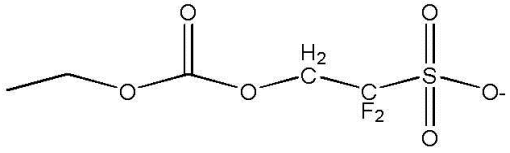
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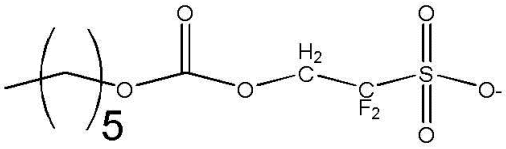
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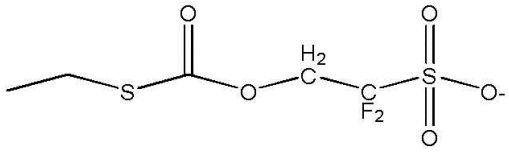
[Formula 50]



[Formula 51]



[Formula 52]



8. The photoresist composition according to claim 5, wherein the photoresist composition comprises the acid generator in an amount of 0.5 to 15 parts by weight relative to 100 parts by weight of the total solids content of the photoresist composition.

9. The photoresist composition according to claim 5, wherein the photoresist composition comprises the copolymer in an amount of 3 to 20% by weight relative to the total weight of the photoresist composition.