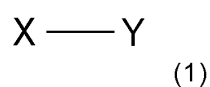


Patent Claims

1. A semiconductor material consisting of a compound represented by formula (1):

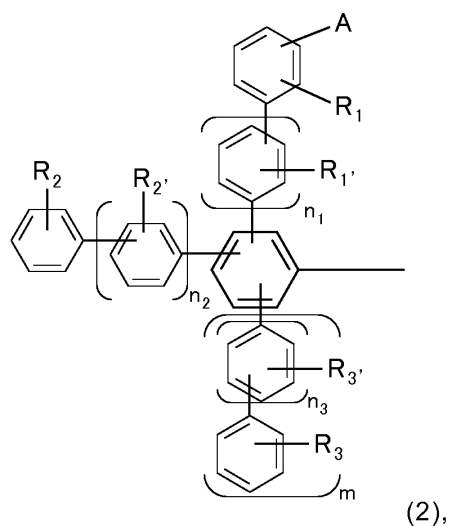
5 [Formula i]



wherein

X is a group represented by formula (2):

[Formula ii]



10

wherein

A is -OH, -NH₂, or -SH,

R₁ is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

15 R_{1'} is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

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R_2 is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

$R_{2'}$ is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

5 R_3 is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

$R_{3'}$ is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

n_1 is 0, 1, or 2,

10 n_2 is 0, 1, or 2,

n_3 is 0, 1, or 2,

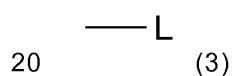
m is 0, 1, 2, or 3, and;

Y is an aromatic hydrocarbon ring unsubstituted or substituted by one or more substituents selected from -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, or

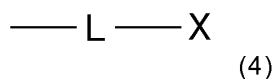
15 branched C₃₋₁₀ alkyl.

2. The semiconductor material according to claim 1, wherein Y is represented by formula (3), (4), (5), or (6):

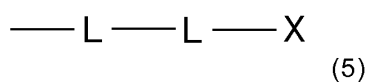
[Formula iii]



[Formula iv]

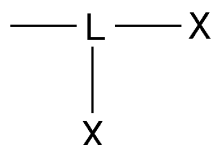


[Formula v]



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[Formula vi]

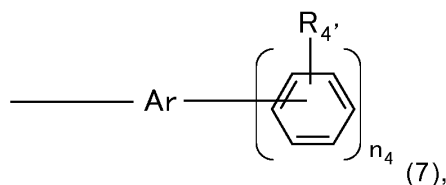


(6),

wherein

L is a group represented by formula (7):

5 [Formula vii]



wherein

Ar is a C₆₋₂₀ aromatic hydrocarbon ring unsubstituted or substituted by a substituent selected from -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, or

10 branched C₃₋₁₀ alkyl,

R_{4'} is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

n₄ is 0, 1, 2, 3, or 4, and

X is as defined in claim 1.

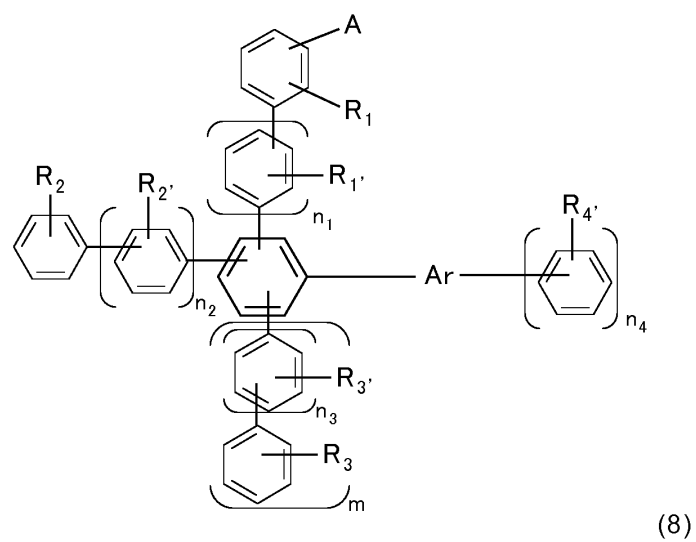
15

3. The semiconductor material according to claim 1 or 2, wherein the compound of formula (1) has 42-120 carbon atoms.

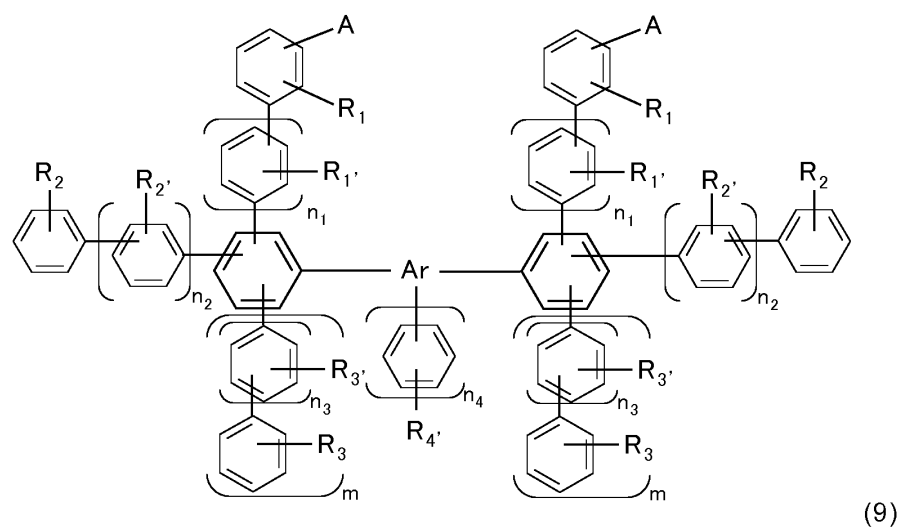
4. The semiconductor material according to any one of claims 1 to 3,

20 wherein the compound of formula (1) is represented by formula (8), (9), (10), or (11):

[Formula viii]

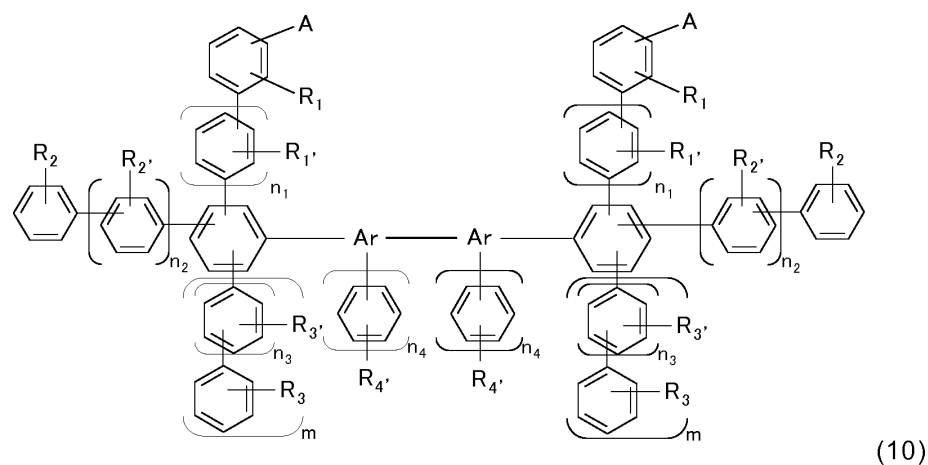


[Formula ix]

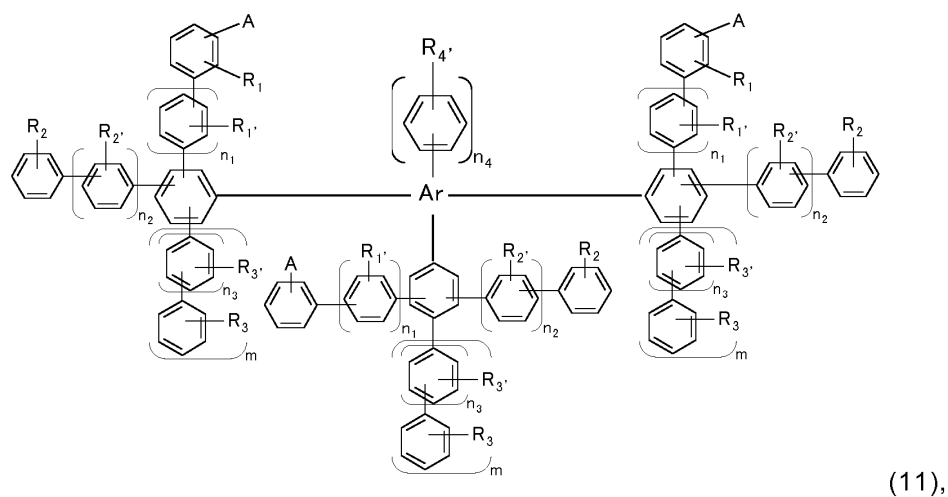


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[Formula x]



[Formula xi]



5 wherein

A, R₁, R₁', R₂, R₂', R₃, R₃', n₁, n₂, n₃, m, Ar, R₄', and n₄ are each independently as defined in claims 1 and 2.

5. A composition comprising a semiconductor material according to any one of claims 1 to 4 and a solvent.

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6. The composition according to claim 5, wherein the solvent is selected from a group consisting of water; n-pentane; i-pentane; n-hexane; i-hexane; n-heptane; i-heptane; 2,2,4-trimethylpentane; n-octane; i-octane; cyclohexane; methylcyclohexane; benzene; toluene; xylene; ethylbenzene; trimethylbenzene; methylethylbenzene; n-propylbenzene; i-propylbenzene; diethylbenzene; i-butylbenzene; triethylbenzene; di-i-propylbenzene; n-amyl naphthalene; trimethylbenzene; methanol; ethanol; n-propanol; i-propanol; n-butanol; i-butanol; sec-butanol; t-butanol; n-pentanol; i-pentanol; 2-methylbutanol; sec-pentanol; t-pentanol; 3-methoxybutanol; n-hexanol; 2-methylpentanol; sec-hexanol; 2-ethylbutanol; sec-heptanol; heptanol-3; n-octanol; 2-ethylhexanol; sec-octanol; n-nonyl alcohol; 2,6-dimethylheptanol-4; n-decanol; sec-undecyl alcohol; trimethylnonyl alcohol; sec-tetradecyl alcohol; sec-heptadecyl alcohol; phenol; cyclohexanol; methylcyclohexanol; 3,3,5-trimethylcyclohexanol; benzyl alcohol; phenylmethylcarbinol; diacetone alcohol; cresol; ethylene glycol; propylene glycol; 1,3-butylene glycol; pentanediol-2,4; 2-methylpentanediol-2,4; hexanediol-2,5; heptanediol-2,4; 2-ethylhexanediol-1,3; diethylene glycol; dipropylene glycol; triethylene glycol; tripropylene glycol; glycerin; acetone; methyl ethyl ketone; methyl n-propyl ketone; methyl n-butyl ketone; diethyl ketone; methyl i-butyl ketone; methyl n-pentyl ketone; ethyl n-butyl ketone; methyl n-hexyl ketone; di-i-butyl ketone; trimethylnonanone; cyclohexanone; cyclopentanone; methylcyclohexanone; 2,4-pentanedione; acetonylacetone; diacetone alcohol; acetophenone; fenchone; ethyl ether; i-propyl ether; n-butyl ether; n-hexyl ether; 2-ethylhexyl ether; ethylene oxide; 1,2-propylene oxide; dioxolane; 4-methyldioxolane; dioxane; dimethyldioxane; ethylene glycol monomethyl

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ether; ethylene glycol monoethyl ether; ethylene glycol diethyl ether;
ethylene glycol mono-n-butyl ether; ethylene glycol mono-n-hexyl ether;
ethylene glycol monophenyl ether; ethylene glycol mono-2-ethylbutyl
ether; ethylene glycol dibutyl ether; diethylene glycol monomethyl ether;
5 diethylene glycol monoethyl ether; diethylene glycol diethyl ether;
diethylene glycol mono-n-butyl ether; diethylene glycol di-n-butyl ether;
diethylene glycol mono-n-hexyl ether; ethoxy triglycol; tetraethylene
glycol di-n-butyl ether; propylene glycol monomethyl ether; propylene
glycol monoethyl ether; propylene glycol monopropyl ether; propylene
10 glycol monobutyl ether; dipropylene glycol monomethyl ether;
dipropylene glycol monoethyl ether; dipropylene glycol monopropyl
ether; dipropylene glycol monobutyl ether; tripropylene glycol
monomethyl ether; tetrahydrofuran; 2-methyltetrahydrofuran; diethyl
carbonate; methyl acetate; ethyl acetate; γ -butyrolactone; γ -
15 valerolactone; n-propyl acetate; i-propyl acetate; n-butyl acetate; i-butyl
acetate; sec-butyl acetate; n-pentyl acetate; sec-pentyl acetate; 3-
methoxybutyl acetate; methylpentyl acetate; 2-ethylbutyl acetate; 2-
ethylhexyl acetate; benzyl acetate; cyclohexyl acetate; methylcyclohexyl
acetate; n-nonyl acetate; methyl acetoacetate; ethyl acetoacetate;
20 ethylene glycol monomethyl ether acetate; ethylene glycol monoethyl
ether acetate; diethylene glycol monomethyl ether acetate; diethylene
glycol monoethyl ether acetate; diethylene glycol mono-n-butyl ether
acetate; propylene glycol monomethyl ether acetate; propylene glycol
monoethyl ether acetate; propylene glycol monopropyl ether acetate;
25 propylene glycol monobutyl ether acetate; dipropylene glycol
monomethyl ether acetate; dipropylene glycol monoethyl ether acetate;
glycol diacetate; methoxytriglycol acetate; ethyl propionate; n-butyl

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propionate; i-amyl propionate; diethyl oxalate; di-n-butyl oxalate; methyl lactate; ethyl lactate; γ -butyrolactone; n-butyl lactate; n-amyl lactate; diethyl malonate; dimethyl phthalate; diethyl phthalate; propylene glycol 1-monomethyl ether 2-acetate; propylene glycol monoethyl ether
5 acetate; propylene glycol monopropyl ether acetate; N-methylformamide; N,N-dimethylformamide; N,N-diethylformamide; acetamide; N-methylacetamide; N,N-dimethylacetamide; N-methylpropionamide; N-methylpyrrolidone; dimethyl sulfide; diethyl sulfide; thiophene; tetrahydrothiophene; dimethyl sulfoxide; sulfolane; 1,3-propanesultone;
10 and any mixture of any of these.

7. The composition according to claim 5 or 6, wherein the amount of the semiconductor material comprising a compound of formula (1) is 2-40 mass% relative to the total amount of the composition.

15

8. The composition according to any one of claims 5 to 7, further comprising a surfactant, a crosslinking agent, an acid generator, a radical generator, an agent for enhancing adhesion to substrates, or any combination of any of these.

20

9. The composition according to claim 8, further comprising a surfactant, a crosslinking agent, or an acid generator.

10. An underlayer-forming composition consisting of a composition
25 according to any one of claims 5 to 9.

11. A method for manufacturing a coating, comprising:

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applying a layer of a composition according to any one of claims 5 to 9 above a substrate; and
curing the layer to form the coating.

5 12. The method according to claim 11, wherein
the substrate is a non-flat substrate, the height difference between the top part and the lower part of the substrate surface is 10-10,000 nm, the composition is an underlayer-forming composition, and the coating formed is an underlayer.

10

13. The method according to claim 11 or 12, wherein conditions for the curing of the layer comprise baking at 150-650°C for 30-180 seconds.

14. A method for manufacturing a semiconductor, comprising :

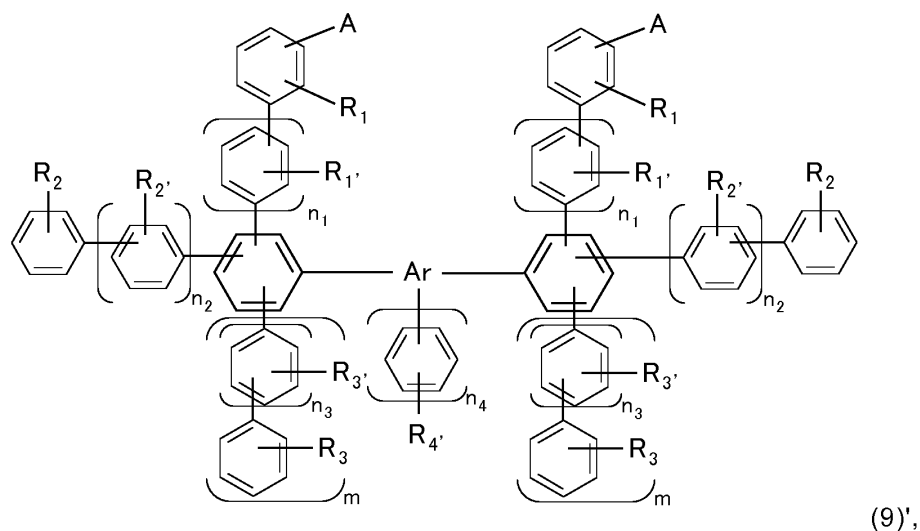
15 forming an underlayer by a method according to claim 12 or 13;
forming a layer of a photoresist composition above the underlayer;
curing the photoresist composition to form a photoresist layer;
exposing the substrate coated with the photoresist layer;
developing the exposed substrate to form a resist pattern;
20 etching with the resist pattern as a mask; and
processing the substrate.

15. The method for manufacturing a semiconductor according to claim 14, further comprising forming wiring in the processed substrate.

25

16. A compound represented by formula (9)':

[Formula xii]



wherein

A is -OH, -NH₂, or -SH,

5 R₁ is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

 R_{1'} is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

10 R₂ is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

 R_{2'} is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

 R₃ is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

15 R_{3'} is hydrogen, -OH, -NH₂, -SH, linear C₁₋₁₀ alkyl, branched C₃₋₁₀ alkyl, or a direct bond to a phenyl ring,

n₁ is 0, 1, or 2,n₂ is 0, 1, or 2,

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n_3 is 0, 1, or 2,

m is 0, 1, 2, or 3,

Ar is a C_{6-20} aromatic hydrocarbon ring unsubstituted or substituted by a substituent selected from -OH, -NH₂, -SH, linear C_{1-10} alkyl, or

5 branched C_{3-10} alkyl,

$R_{4'}$ is hydrogen, -OH, -NH₂, -SH, linear C_{1-10} alkyl, branched C_{3-10} alkyl, or a direct bond to a phenyl ring, and

n_4 is 0, 1, 2, 3, or 4,

provided that the following compounds are excluded:

10 [Formula xiii]

