What is claimed is:

1. A composition consisting essentially of components a), b), c), e) and optionally d), or consisting essentially of a), b), c), e), f) and optionally d)

a) a blend of two Novolak polymers having structures (I) and (II); wherein R_1 to R_9 are individually selected from a C-1 to C-4 alkyl and x, y and z represent the mole % based on total moles of repeat units in the polymer of structure (I); k, l and m represent the mole % based on total moles of repeat units in the polymer of structure (II) and further wherein x ranges from 10 to 20 mole %, y ranges from 50 to 60 mole %, z ranges from 30 to 40 mole%, k ranges from 10 to 20 mole %, l ranges from 40 to 50 mole %, m ranges from 30 to 40 mole %, and further wherein for structure (I) the sum of x, y and z is 100 mole %, and in structure (II) the sum of k, l and m is 100 mole%;

b) a diazo-naphthoquinone sulfonate (DNQ-PAC) component which is a single material or a mixture of materials having general formula having structure (III) or having general formula (III-1); wherein D_{1c}, D_{2c}, $D_{3c,}$ D_{4c} and D_{5c} are individually selected from H or a moiety having structures (IV) or (V), and further wherein in structure (III) at least one of D_{1c}, D_{2c}, D_{3c} or D_{4c} is a moiety having structure (IV) or (V) and in structure (III-1) at least one of D_{1c}, D_{2c}, $D_{3c,}$ $D_{4c,}$ D_{5c} is a moiety having structure (IV) or (V);

c) is a dissolution enhancer component comprising a polyphenolic compound which is a single compound or a mixture of at least two compounds selected from the group consisting of an oligomeric fractionated Novolak, a compounds having general structure (VI) and a compound having general structure (VII), wherein R_{de1}, R_{de2}, R_{de3}, R_{de4} and R_{de5} are individually selected from a C-1 to C-4 alkyl;

d) a surfactant.

e) an organic spin casting solvent;

wherein the wt. % solids range of components a), b), c) and d), using a wt. % solids calculated from the total weight of components a), b), c) and d), which combined add up to 100 wt. % solids are as follows:

component a) is one wherein wt. % solid of, said Novolak polymers of structure (I) and (II), each independently range from 23 wt. % to 70 wt. %,

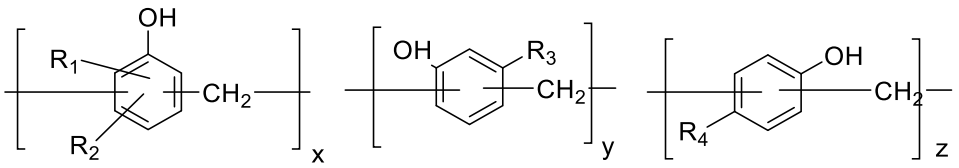
component b) ranges from 9 wt. % to 15 wt. %,

component c) ranges from 4 wt. % to 15 wt. % and

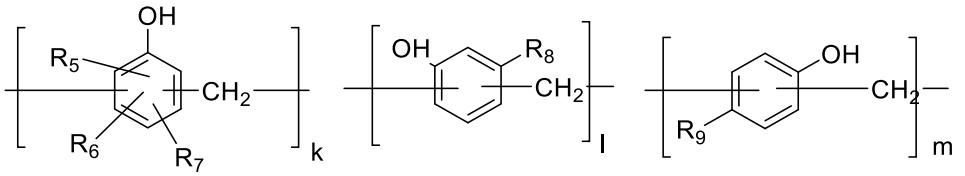
component d), ranges from 0 wt. % to 0.2 wt. %; and further

this composition is free of hexamethyl melamine crosslinkers and photoacid generators,

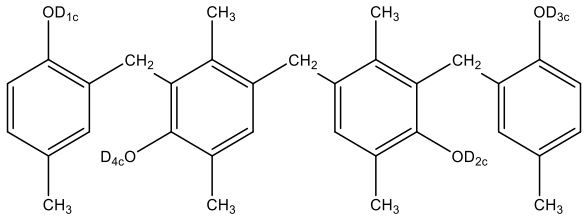
f) a heterocyclic thiol component.



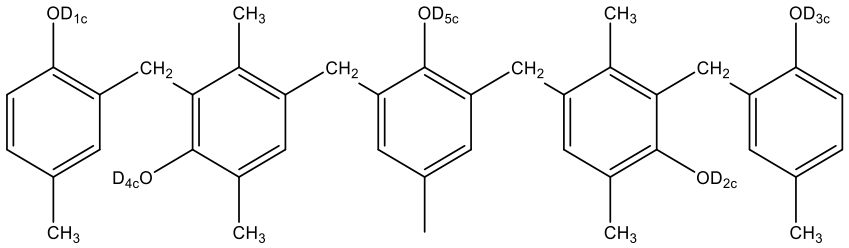
(Ia) (Ib) (Ic) (I)



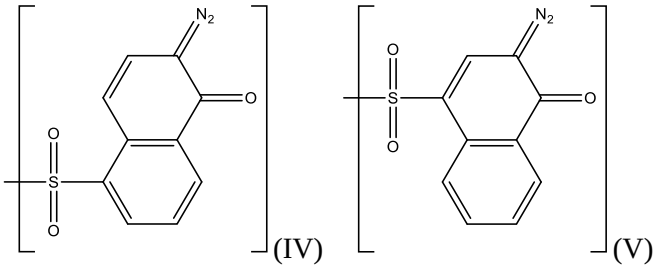
(IIa) (IIb) (IIc) (II)



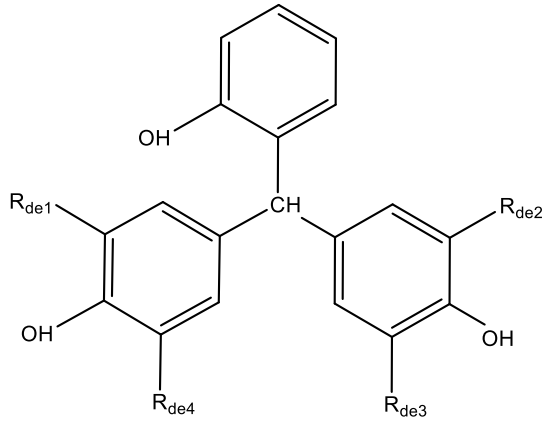
(III)



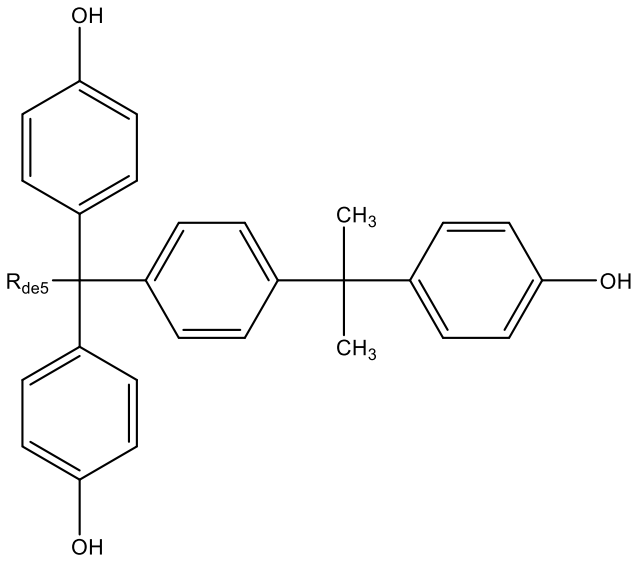
(III-1)



(IV) (V)



(VI)



(VII).

2. The composition of claim 1, wherein R_1 to R_9 are methyl.

3. The composition of any claim 1 or 2, wherein in the polymer of structure (I),
x ranges from 15 to 20 mole %,
y ranges from 50 to 55 mole %, and
z ranges from 30 to 35 mole %.

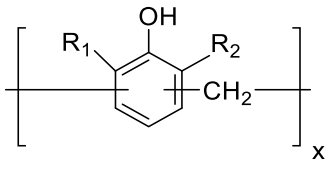
4. The composition of any one of claims 1 to 3, wherein in the polymer of structure (I), the repeat unit of structure (Ia), whose mole % x ranges from 10 to 20 mole %, is comprised of a mixture of isomeric repeat units having structures (Iax1), (Iax2), (Iax3) (Iax4), (Iax5), and (Iax6), which respectively have mole % values of x1, x2, x3, x4, x5 and x6, based on the total amount of the repeat unit of structure (Ia) wherein;
x1, the mole % values of the repeat unit of structure (Iax1), ranges from 0 to 5 mole %,
x2, the mole % values of the repeat unit of structure (Iax2), ranges from 0 to 5 mole %,
x3, the mole % values of the repeat unit of structure (Iax3), ranges from 20 to 25 mole %,

x4, the mole % values of the repeat unit of structure (Iax4), ranges from 20 to 25 mole %,

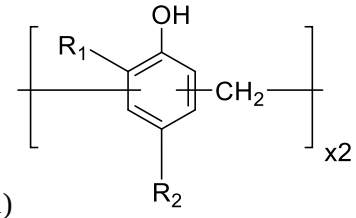
x5, the mole % values of the repeat unit of structure (Iax5), ranges from 20 to 25 mole %,

x6, the mole % values of the repeat unit of structure (Iax6), ranges from 20 to 25 mole %, and further wherein the sum of x1, x2, x3, x4, x5 and x6, based on the Novolak polymer of structure (I) adds to be from 10 mole % to 20 mole% and sum of x1, x2, x3, x4, x5, x6, y and z, based on the Novolak polymer of structure (I) equals 100 mole %;

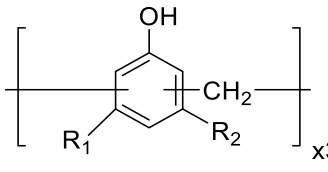
and wherein R_1 and R_2 have the same meaning as in any one of claims 1 to 4;



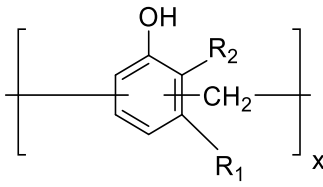
(Iax1)



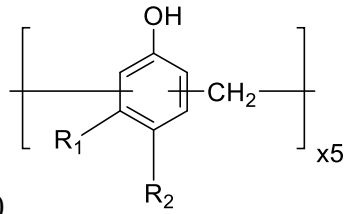
(Iax2)



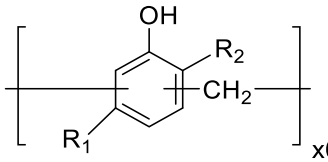
(Iax3)



(Iax4)



(Iax5)



(Iax6) .

5. The composition of any one of claims 1 to 4, wherein in the polymer of structure (II), the repeat unit of structure (IIa), whose mole % k ranges from 10 mole% to 20 mole%, is comprised of a mixture of isomeric repeat units having structures (IIax1), (IIax2), (IIax3) (IIax4), (IIax5), and (IIax6), which respectively have mole % values of k1, k2, k3, k4, k5 and k6, where the total of these mole % values ranges from 10 mole % to 20 mole %,, wherein;

k1, the mole % values of the repeat unit of structure (IIak1), ranges from 10 to 20 mole %,

k2, the mole % values of the repeat unit of structure (IIak2), ranges from 0 to 5 mole %,

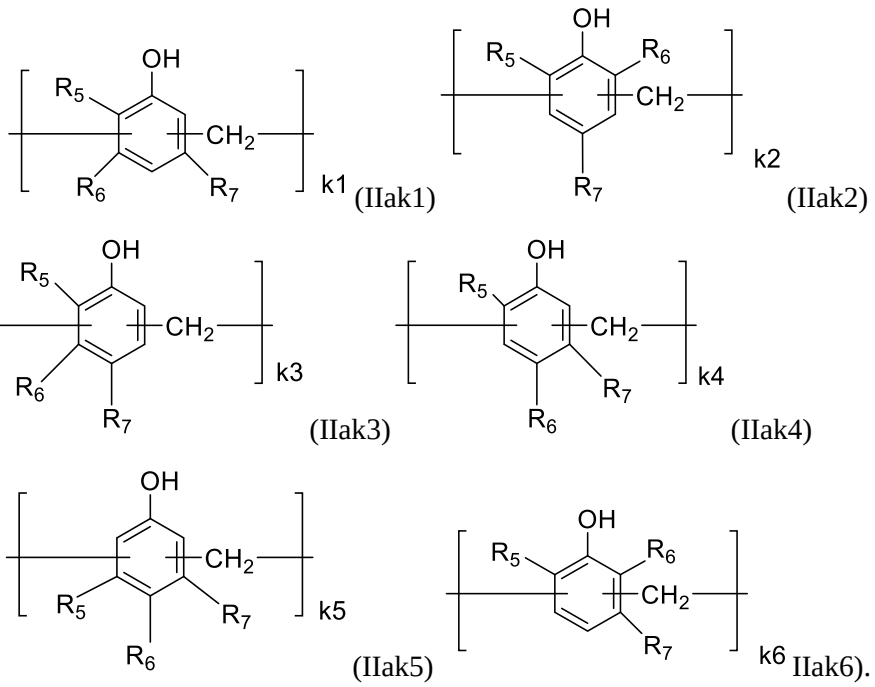
k3, the mole % values of the repeat unit of structure (IIak3), ranges from 0 to 5 mole %,

k4, the mole % values of the repeat unit of structure (IIak4), ranges from 0 to 5 mole %,

k5 the mole % values of the repeat unit of structure (IIak5), ranges from 0 to 5 mole %,

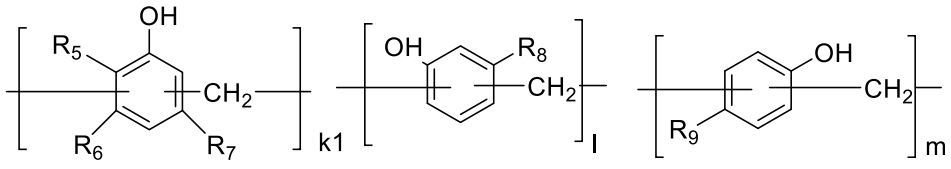
k6 the mole % values of the repeat unit of structure (IIak6) , ranges from 0 to 5 mole %, and further wherein the sum of k1, k2, k3, k4, k5, k6 and l and m equals 100 mole %;

and wherein R_5, R_6 and R_7 have the same meaning as in any one of claims 1 to 4;



6. The composition of any one of claims 1 to 5, wherein said polymer of structure (II) has the more specific structure (II-1), where k1 ranges from 10 to 20 mole %, l ranges from 40 to 50 mole %, m ranges from 30 to 40 mole %, and further wherein for structure (II-1) the sum of k1, l and m is 100 mole %;

and wherein R_5, R_6, R_7, R_8 and R_9 have the same meaning as in any one of claims 1 to 5;



7. The composition of any one of claims 1 to 6, wherein in the polymer of structure (II),
k ranges from 15 to 20 mole %,
l ranges from 40 to 50 mole %, and
m ranges from 35 to 40 mole %.

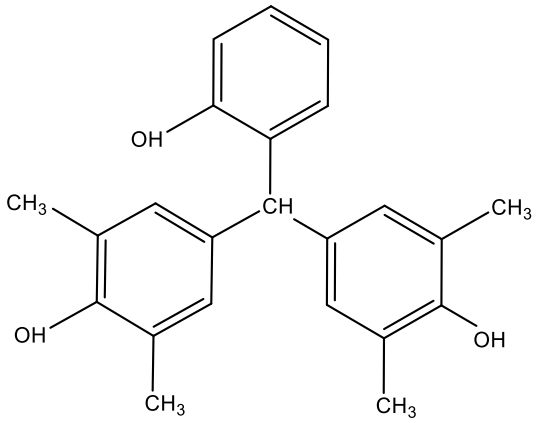
8. The composition of any one of claims 1 to 7, wherein component b) said DNQ PAC is one wherein D_{1c}, D_{2c}, D_{3c} and D_{4c} are individually selected from H or a moiety having structures (IV), and further wherein at least one of D_{1c}, D_{2c}, D_{3c} or D_{4c} is a moiety having structure (IV).

9. The composition of any one of claims 1 to 8, wherein component c) said dissolution enhancer is an oligomeric fractionated Novolak.

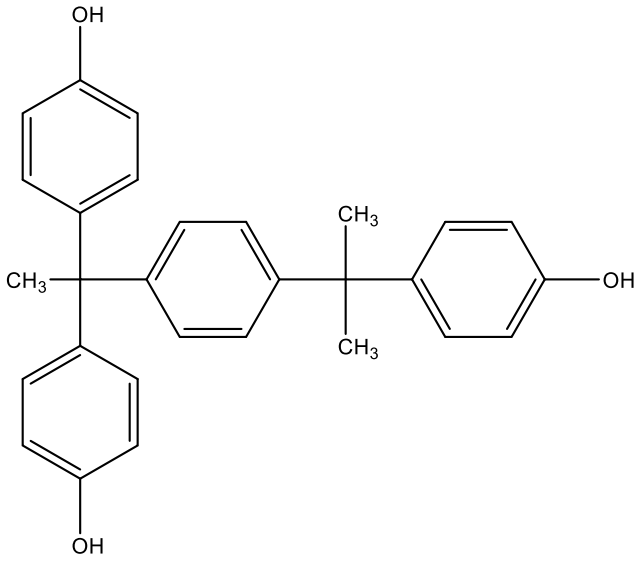
10. The composition of any one of claims 1 to 8, wherein component c) said dissolution enhancer is a compound of structure (VI), a compound of structure (VII) or a mixture of these.

11. The composition of any one of claims 1 to 8, wherein component c) said dissolution enhancer has structure (VI) and further where R_{de1}, R_{de2}, and R_{de3}, are all selected from the same C-1 to C-4 alkyl.

12. The composition of any one of claims 1 to 8, wherein component c) said dissolution enhancer is either selected from one having structure (VIa), or structure (VIIa) or is a mixture of the speed enhancers of structures (VIa) and (VIIa);



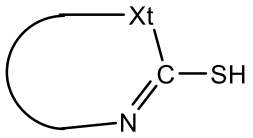
(VIa).

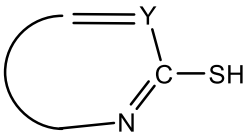


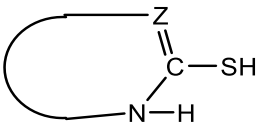
(VIIa).

13. The composition of any one of claims 1 to 18, wherein the component f) is at least one heterocyclic thiol compound comprising a ring structure chosen from the general structures (H1), (H2) or (H3), or tautomers thereof; and said ring structure is a single ring structure having from 4 to 8 atoms, or a multi ring structure

having from 5 to 20 atoms; and wherein the single ring structure, or the multi ring structure comprises an aromatic, non-aromatic, or heteroaromatic ring. In said structure (H1), Xt is selected from the group consisting of N(Rt3), C(Rt_1)(Rt_2), O, S, Se, and Te. In said structure (H2), Y is selected from the group consisting of C(Rt_3) and N. In said structure (H3), Z is selected from the group consisting of C(Rt_3) and N. In these structures Rt_1, Rt_2, and Rt_3 are independently selected from the group consisting of H, a substituted alkyl group having 1 to 8 carbon atoms, an unsubstituted alkyl group having 1 to 8 carbon atoms, a substituted alkenyl group having 2 to 8 carbon atoms, unsubstituted alkenyl group having 2 to 8 carbon atoms, a substituted alkynyl group having 2 to 8 carbon atoms, unsubstituted alkynyl group having 2 to 8 carbon atoms, a substituted aromatic group having 6 to 20 carbon atoms, a substituted heteroaromatic group having 3 to 20 carbon atoms, unsubstituted aromatic group having 6 to 20 carbon atoms and unsubstituted heteroaromatic group having 3 to 20 carbon atoms,



(H1)


(H2)


(H3).

14. A process for imaging a resist comprising the steps;

ia) coating the composition of any one of claims 1 to 13 on a substrate to form a resist film;

iia) selectively exposing the resist film to UV light using a mask to form a selectively exposed resist film;

iiia) optionally baking the selectively exposed resist film to form a baked selectively exposed resist film;

iva) developing the selectively exposed and optionally baked resist film to form a positively imaged resist film over the substrate.

15. The use of the composition of any one of claims 1 to 13 for coating a substrate or for preparing an imaged resist film on a substrate.