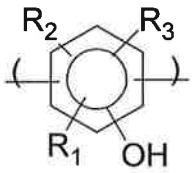
Claims

1. An underlayer coating composition comprising a polymer, where the polymer comprises at least one hydroxyaromatic unit in the backbone of the polymer comprising a fluoro or iodo moiety, and at least one unit comprising an aminoplast, further where the hydroxyaromatic unit with the fluoro moiety has structure (1),



(1)

where, R_1 is fluoro moiety, R_2 is fluoro moiety and R_3 is selected from a group consisting of an iodo moiety, a fluoro moiety, hydrogen, hydroxyl, (C_1-C_4)alkyl, hydroxy(C_1-C_4)alkyl, OC_1-C_4alkyl, (C=O)(C_1-C_4)alkyl, C_1-C_4alkylO(C_1-C_4)alkyl, C_1-C_4alkyl(C=O)(C_1-C_4)alkyl and C(O)O(C_1-C_4)alkyl.

2. The composition of claim 1, where the fluoro moiety is selected from F, C_1-C_4fluoroalkyl, C_1-C_4 hydroxyfluoroalkyl, OC_1-C_4fluoroalkyl C(O)(C_1-C_4)fluoroalkyl, and C(O)O(C_1-C_4)fluoroalkyl.

3. The composition of claim 1, where the unit comprising an aminoplast is derived from a glycoluril monomer.

4. The composition of claim 1, where the unit comprising an aminoplast is derived from a urea/formaldehyde oligomer.

5. The composition of claim 1, where the polymer further comprises a phenolic unit free of a fluoro or iodo moiety.

6. The composition of claim 1, where the composition further comprises a thermal acid generator.

7. The composition of claim 1, where the composition further comprises a polyester polymer.

8. The composition of claim 1, where the composition further comprises a glycoluril polymer different from the polymer of claim 1.

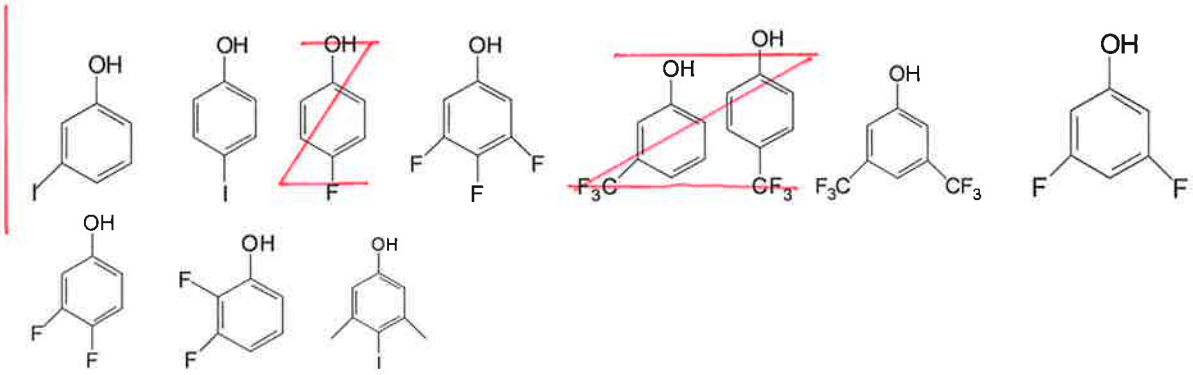
9. The composition of claim 1, wherein the hydroxyaromatic unit is naphthol.

10. The composition of claim 1 further comprising a solvent.

11. The composition of claim 1 further comprising a secondary solvent.

12. The composition or polymer of claim 1 having a fluoro or iodo content in the range of 1% to 30% by weight.

13. The composition of claim 1, where the hydroxyaromatic unit is derived from



14. The composition of claim 1, where the composition is free of an external crosslinker.

15. A process for manufacturing a microelectronic device, comprising;

a) providing a substrate with a layer of an underlayer coating composition from claim 1;

b) coating a photoresist layer above the underlayer coating;

c) imagewise exposing the photoresist layer;

d) developing the photoresist layer with an aqueous alkaline developing solution.

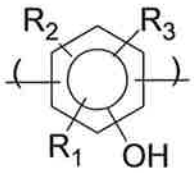
16. The process of claim 15, where the underlayer coating layer has k value in the range of 0.05 to 1.0.

17. The process of claim 15, where the underlayer coating layer has k value in the range of 0.05 to 0.5.

18. The process of claim 15, where the photoresist is imageable with radiation from 260 nm to 12 nm.

19. The process according to claim 15, where the developing solution is an aqueous solution comprising a hydroxide base.

20. The composition of claim 1, where the hydroxyaromatic unit with the iodo moiety has structure (1),



(1)

where, R_1 is selected from an iodo moiety, R_2 and R_3 are independently selected from an iodo moiety, a fluoro moiety, hydrogen, hydroxyl, $(C_1\text{-}C_4)$alkyl, hydroxy$(C_1\text{-}C_4)$alkyl, $OC_1\text{-}C_4$alkyl, $(C{=}O)(C_1\text{-}C_4)$alkyl, $C_1\text{-}C_4$alkyl$O(C_1\text{-}C_4)$alkyl, $C_1\text{-}C_4$alkyl$(C{=}O)(C_1\text{-}C_4)$alkyl, $C(O)O(C_1\text{-}C_4)$alkyl and R_2 and R_3 are connected to form hydroxyaromatic ring fused to the phenol.