Claims:

1. A method for forming a pattern on a substrate wherein the method comprises

(I) applying a coating composition over a first patterned material containing an activator selected from a thermal acid generator, a photo acid generator or an amine crosslinker wherein the coating composition comprises

(i) a silsesquioxane resin comprised of the units

$(HSiO_{(3-x)/2}(OR')_x)_m$

$(RSiO_{(3-x)/2}(OR')_x)_n$

$(R^1SiO_{(3-x)/2}(OR')_x)_p$

$(R^2SiO_{(3-x)/2}(OR')_x)_q$

Wherein R' is hydrogen atom or a hydrocarbon group having from 1 to 4 carbon atoms; R is a photocurable group selected from groups containing epoxy; groups containing acryloxy functionality, and a vinylether group; R^1 is a hydrophilic organic group; R^2 is any organic auxiliary group; x has a value of 0, 1 or 2; wherein in the resin m has a value of 0.10 to 0.95, n has a value of 0.05 to 0.7; p has a value of 0.05 to 0.5; q has a value of 0 to 0.5; and $m + n + p + q \approx 1$; and

(II) exposing the coating composition to a cure mechanism to produce a cured coating on the surface of the first pattern material

(III) removing any uncured coating composition

(V) removing the cured coating from any horizontal surfaces resulting in cured coating on sidewalls of the first pattern material;

(V) removing the first pattern material thereby producing a second pattern on the substrate wherein the second pattern comprises the cured coating composition.

2. The method as clamed in claim 1 wherein m has a value of 0.2 to 0.90, n has a value of 0.05 to 0.50, p has a value of 0.05 to 0.30, and q has a value of 0 to 0.25.

3. The method as claimed in claim 1 wherein m has a value of 0.3 to 0.85, n has a value of 0.1 to 0.3, p has a value of 0.1 to 0.20, and q has a value of 0.01 to 0.20.

4. The method as claimed in claims 1, 2 or 3 wherein R is an epoxy group having the formula $-R^2OCH_2CH(O)CH_2$, where R^2 is hydrocarbon group having 1 to 4 carbon atoms or a polyether group or $-CH_2CH_2-(C_6H_9(O))$.

5. The method as claimed in claim 4 wherein R is a 3-glycidoxypropyl group.

6. The method as claimed in claim 4 wherein R is 2-(3,4-epoxycyclohexyl) group.

7. The method as claimed in claims 1, 2 or 3 wherein R is and acryloxy group having the formula $CH_2=C(R^3)COOR^4-$, where R^3 is hydrogen atom or a methyl group and R^4 is hydrocarbon group having 1 to 4 carbon atoms or a polyether group.

8. The method as claimed in claim 7 wherein R is methacryloxypropyl.

9. The method as claimed in claim 7 wherein R is acryloxypropy.

10. The method as claimed in claims 1, 2 or 3 wherein R is a vinylether group.

11. The method as claimed in claim 1 wherein the coating composition also comprises a solvent.

12. The method as claimed in claim 1 wherein the coating composition is thermally cured by heating the coating composition.

13. The method as claimed in claim 1 wherein the coating composition is cured by exposing the composition to radiation.

14. The method as claimed in claim 1 wherein any uncured coating composition is removed with a developer solution.

15. The method as claimed in claim 1 wherein the cured coating is removed from any horizontal surfaces by a reactive ion etching technique.

16. The method as claimed in claim 1 wherein the cured coating is removed by etching with CF_4.

17. The method as claimed in claim 1 wherein the first patterned material is removed by etching.

18. The method as claimed in claim 1 wherein the first patterned material is removed by etching with O_2 plasma.

CLAIMS:

1. A method for forming a pattern on a substrate wherein the method comprises

(I) applying a coating composition over a first patterned material containing an activator selected from a thermal acid generator, a photo acid generator or an amine crosslinker wherein the coating composition comprises a silsesquioxane resin comprised of the units

$(HSiO_{(3-x)/2}(OR')_x)_m$

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$(R^1SiO_{(3-x)/2}(OR')_x)_p$

$(R^2SiO_{(3-x)/2}(OR')_x)_q$

wherein R' is hydrogen atom or a hydrocarbon group having from 1 to 4 carbon atoms; R is a photocurable group selected from groups containing epoxy; groups containing acryloxy functionality, and a vinylether group; R^1 is a hydrophilic organic group; R^2 is any organic auxiliary group; x has a value of 0, 1 or 2; wherein in the resin m has a value of 0.10 to 0.95, n has a value of 0.05 to 0.7; p has a value of 0.05 to 0.5; q has a value of 0 to 0.5; and $m+n+p+q \approx 1$;

(II) exposing the coating composition to a cure mechanism to produce a cured coating on the surface of the first pattern material;

(III) removing any uncured coating composition;

(IV) removing the cured coating from any horizontal surfaces resulting in cured coating on sidewalls of the first pattern material; and

(V) removing the first pattern material thereby producing a second pattern on the substrate wherein the second pattern comprises the cured coating composition.

2. The method as clamed in claim 1 wherein m has a value of 0.2 to 0.90, n has a value of 0.05 to 0.50, p has a value of 0.05 to 0.30, and q has a value of 0 to 0.25.

3. The method as claimed in claim 1 wherein m has a value of 0.3 to 0.85, n has a value of 0.1 to 0.3, p has a value of 0.1 to 0.20, and q has a value of 0.01 to 0.20.

4. The method as claimed in claim 1, wherein R is an epoxy group having the formula $-R^2OCH_2CH(O)CH_2$, where R^2 is hydrocarbon group having 1 to 4 carbon atoms or a polyether group or $-CH_2CH_2-(C_6H_9(O))$.

5. The method as claimed in claim 4 wherein R is a 3-glycidoxypropyl group.

6. The method as claimed in claim 4 wherein R is 2-(3,4-epoxycyclohexyl) group.

7. The method as claimed in claim 1, wherein R is and acryloxy group having the formula $CH_2=C(R^3)COOR^4$-, where R^3 is hydrogen atom or a methyl group and R^4 is hydrocarbon group having 1 to 4 carbon atoms or a polyether group.

8. The method as claimed in claim 7 wherein R is methacryloxypropyl.

9. The method as claimed in claim 7 wherein R is acryloxypropy.

10. The method as claimed in claim 1, wherein R is a vinylether group.

11. The method as claimed in claim 1 wherein the coating composition also comprises a solvent.

12. The method as claimed in claim 1 wherein the coating composition is thermally cured by heating the coating composition.

13. The method as claimed in claim 1 wherein the coating composition is cured by exposing the composition to radiation.

14. The method as claimed in claim 1 wherein any uncured coating composition is removed with a developer solution.

15. The method as claimed in claim 1 wherein the cured coating is removed from any horizontal surfaces by a reactive ion etching technique.

16. The method as claimed in claim 1 wherein the cured coating is removed by etching with CF_4.

17. The method as claimed in claim 1 wherein the first patterned material is removed by etching.

18. The method as claimed in claim 1 wherein the first patterned material is removed by etching with O_2 plasma.