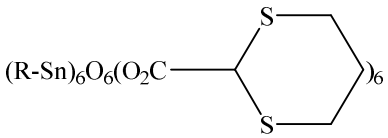
Claims

1. A method for positive tone processing comprising the steps of:

(i) spin coating a composition comprising

(a) a metal organic resist (MOR) of the following formula:



wherein R is a C_1-C_6 alkyl group; and

(b) at least one spin-coatable solvent on a substrate; and

(ii) exposing the spin-coated composition to actinic radiation.

2. The method of claim 1, wherein R is a methyl group.

3. The method of claim 1, wherein R is an ethyl group.

4. The method of claim 1, wherein R is a propyl group.

5. The method of claim 1, wherein R is a butyl group.

6. The method of claim 1, wherein R is a pentyl group.

7. The method of claim 1, wherein R is a hexyl group.

8. The method of claim 1, wherein the metal organic resist and at least one solvent of step (i) comprise about 49% to about 99% by weight of the composition.

9. The method of claim 1, wherein the actinic radiation is EUV radiation of 13.5 nm wavelength.

10. The method of claim 1, further comprising a step **(i-2)** of conducting a post apply bake ("PAB") thermal treatment of the substrate carrying the spin-coated composition prior to step (ii).

11. The method of claim 1, further comprising a step **(iii)** of conducting a post exposure bake ("PEB") thermal treatment of the substrate carrying the spin-coated composition after step (ii).

12. The method of claim 11, wherein the PEB occurs at a temperature above the ambient temperature.

13. The method of claim 11, wherein the PEB occurs at a temperature between about 80 ^oC and about 200 ^oC or for about 30 seconds to about 300 seconds.

14. The method of claim 1, further comprising a step **(iv)** of developing the substrate in a solvent.

15. The method of claim 14, wherein the developing of the substrate in the solvent developer

occurs for about 30 seconds to about 300 seconds.

16. The method of claim 1, further comprising a step of **(v)** a solvent rinse.

17. The method of claim 1, further comprising a step of **(vi)** developing the substrate in an aqueous base developer.

18. The method of claim 17, wherein the step (vi) aqueous developer comprises one or more of tetramethyl ammonium hydroxide (TMAH), tetra-n-butyl ammonium hydroxide and choline hydroxide.

19. The method of claim 17, wherein the step (vi) aqueous base developer comprises tetramethyl ammonium hydroxide (TMAH).

20. The method of claim 1, further comprising a step **(vii)** of conducting a thermal treatment step following step (vi).

21. The method of claim 20, wherein the thermal treatment occurs at a temperature of from about 110 ^{o}C to about 300 ^{o}C or occurs for about 30 seconds to about 300 seconds.