CLAIMS

1. A method comprising:

placing a substrate into a chamber, the substrate comprising a layer including at least one trench formed therein, the at least one trench having a top surface, a bottom surface, and at least one side wall;

depositing a polymer film on the bottom surface of the at least one trench without depositing the polymer film on the at least one side wall of the at least one trench, wherein the polymer film is a flowable film that flows to the bottom surface of the at least one trench during depositing of the flowable film at a temperature in a target temperature range;

selectively forming a second film on the layer without forming the second film on the polymer film;

removing the polymer film from the bottom surface of the at least one trench; and

etching the bottom surface of the trench using an etch chemistry, wherein the second film protects the at least one sidewall from the etch chemistry.

2. The method of claim 1, wherein the second film comprises a self-assembled monolayer (SAM) that does not form on the polymer film.

3. The method of claim 1, wherein the layer comprises silicon, silicon nitride, damaged silicon nitride, silicon oxide, or low κ material, wherein the substrate comprises silicon.

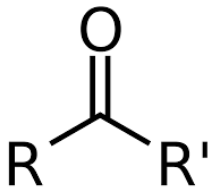
4. The method of claim 1, wherein the bottom surface has a U-shaped profile and comprises the substrate.

5. The method of claim 1, further comprising removing the second film after performing the etching.

6. The method of claim 1, wherein removing the polymer film comprises at least one of heating the polymer film or exposing the polymer film to a plasma.

7. The method of claim 1, wherein the polymer film comprises a carbon-based compound.

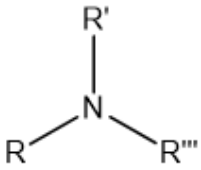
8. The method of claim 7, wherein the carbon-based compound comprises at least one precursor selected from Formula 1 and Formula 2, wherein Formula 1 is one of the following:



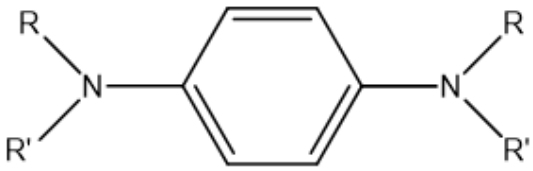
wherein R is H, an alkyl group, or an aryl group and R' is Cl, Br, I OR, OH, H NR_2, $Si(NCO)_4$, $Si(NCS)_4$, or



wherein R' is Cl, Br, I OR, OH, H or NR_2; and
wherein Formula 2 is one of the following:

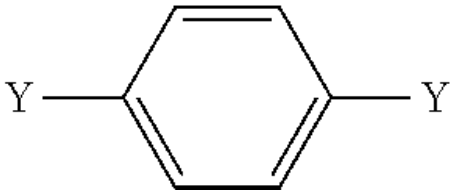


wherein, R, R', and R''' are each independently H, an alkyl group or an aryl group; or



wherein, R and R', are each independently H, an alkyl group or an aryl group.

9. The method of claim 7, wherein the carbon-based compound comprises precursor selected from Formula A;



wherein, Y is a hydroxide group, an aldehyde group, a ketone group, an acid group, an amino group, an isocyanate group, a thiocyanate group, or an acyl chloride group.

10. The method of claim 7, wherein the carbon-based compound is terephthalaldehyde.

11. The method of claim 1, wherein the second film comprises at least one of a silyl amide, a silyl halide, a silyl alkoxide or a cyclic silylamide.

12. The method of claim 1, wherein the at least one sidewall of the at least one trench is not etched as a result of being protected from the etch chemistry by the second film.

13. The method of claim 1, further comprising removing an oxide from the bottom surface of the at least one trench during the etching.

14. The method of claim 1, wherein the etch chemistry comprises ammonium fluoride.

15. A method comprising:

placing a substrate into a chamber, the substrate comprising a layer including at least one trench formed therein, the at least one trench having a top surface, a bottom surface, and at least one side wall;

depositing a polymer film on the bottom surface of the at least one trench without depositing the polymer film on the least one side wall of the at least one trench, wherein the polymer film is a flowable film that flows to the bottom surface of the at least one trench during depositing of the flowable film at a temperature in a target temperature range; and

selectively forming a second film on the layer without forming the second film on the polymer film.

16. The method of claim 15, wherein the polymer film is terephthalaldehyde and the second film comprises a self-assembled monolayer (SAM) that does not form on the polymer film.

17. A method comprising:

placing a substrate into a chamber, the substrate comprising a layer including at least one trench formed therein, the at least one trench having a top surface, a bottom surface, and at least one side wall;

depositing a polymer film on the bottom surface of the at least one trench without depositing the polymer film on the least one side wall of the least one trench, wherein the polymer film is a flowable film that flows to the bottom surface of the at least one trench during depositing of the flowable film at a temperature in a target temperature range; and

selectively forming a second film on the layer without forming the second film on the polymer film,

removing the polymer film from the bottom surface of the at least one trench,

performing an etch process, wherein the etch process comprises applying ammonium fluoride to the substrate,

wherein the performing the etch process selectively interacts with the bottom surface of the at least one trench and does not interact with the top surface and the at least one side wall.