CLAIMS

1. A method comprising:

providing a substrate comprising one or more features, each of the one or more feature having at least one opening and an interior region fluidically accessible through the at least one opening;

depositing a first layer of molybdenum in the one or more features; and

treating the first layer non-conformally such that that the treatment is preferentially applied at portions of the first layer near the at least one opening of the one or more features relative to portions of the first layer that are further in the interior region of the feature, wherein the treatment comprises inhibition or etching and wherein the effect of the treatment is decreased with distance from the at least one opening.

2. The method of claim 1, wherein treating the first layer non-conformally comprises inhibiting the first layer non-conformally.

3. The method of claim 1, wherein treating the first layer non-conformally comprises etching the first layer non-conformally.

4. The method of claim 2 or 3, wherein treating the first layer is performed during depositing the first layer of molybdenum.

5. The method of claim 4, wherein the method comprises exposing the one or more features to a molybdenum precursor under conditions such that the precursor flux or concentration is nearer the at least one opening of the one or more features.

6. The method of claim 5, wherein the molybdenum precursor is a molybdenum oxyhalide.

7. The method of claim 6, wherein the molybdenum oxyhalide has a lower growth rate near the one or more openings of the one or more features than in the interior region due to etch reactions.

8. The method of claim 6, wherein the molybdenum oxyhalide has a lower growth

rate near the one or more openings of the one or more features than in the interior region due to an inhibition treatment.

9. The method of claim 2 or 3, wherein treating the first layer is performed after the first layer of molybdenum is deposited.

10. The method of claim 9, wherein treating the first layer comprises exposing it to an inhibition chemistry.

11. The method of claim 10, wherein the inhibition chemistry is a nitrogen-containing chemistry.

12. The method of claim 11, wherein treating the first layer comprises, after exposing it to a nitrogen-containing chemistry, exposing it to one or more of hydrogen gas and a molybdenum precursor.

13. The method of claim 9, wherein treating the first layer comprises exposing it to an etch chemistry.

14. The method of claim 13, wherein the etch chemistry is a halogen-containing chemistry.

15. The method of claim 14, wherein treating the first layer comprises, after exposing it to a halogen-containing chemistry, purging a chamber housing the substrate.

16. The method of any of claims 1–9, wherein treating the first layer comprises exposing it to nitrogen-containing compound.

17. The method of any of claims 1–9, wherein treating the first layer comprises exposing it to halogen-containing compound.

18. The method of any of claims 1–9, wherein the treating the first layer comprises exposing it to ammonia or nitrogen trifluoride.

19. The method of any of claims 1–18, wherein treating the first layer is a non-plasma thermal process.

20. The method of any of claims 1–18, wherein treating the first layer is a plasma process.

21. The method of any of claims 1–20, wherein depositing the first layer of molybdenum comprises an atomic layer deposition process using H_2 as a reducing agent for a molybdenum oxyhalide or molybdenum halide precursor.

22. The method of any of claims 1–21, further comprising, after treating the first layer non-conformally, further comprising depositing a second layer of molybdenum.

23. The method of claim 22, where depositing the second layer comprises an atomic layer deposition process using H_2 as a reducing agent for a molybdenum oxyhalide or molybdenum halide precursor.

24. The method of any of claims 1–23, wherein the substrate comprises a 3-D structure having sidewalls, wherein the one or more openings of the one or more features are openings in the sidewalls.

25. The method of any of claims 1–23, wherein the one or more features have a closed end.

26. The method of claim 1, further comprising depositing a second layer of molybdenum in the feature, wherein the second layer is deposited by a bottom-up fill process.

27. The method of claim 1, wherein depositing the first layer comprises a bottom-up fill process.