CLAIMS:

1. An etching method comprising:

flowing a halogen-containing precursor into a remote plasma region of a semiconductor processing chamber while striking a plasma to produce plasma effluents;

contacting a substrate housed in a processing region with the plasma effluents, wherein the substrate defines an exposed region of tungsten oxide, and wherein the contacting produces a tungsten oxy-fluoride material;

increasing a pressure in the semiconductor processing chamber;

flowing an etchant precursor into the processing region, wherein the semiconductor processing chamber is maintained plasma-free during the flowing of the etchant precursor;

contacting the tungsten oxy-fluoride material with the etchant precursor; and

removing the tungsten oxy-fluoride material.

2. The etching method of claim 1, wherein the halogen-containing precursor comprises fluorine, and wherein the etchant precursor comprises a chlorine-containing precursor.

3. The etching method of claim 2, wherein the halogen-containing precursor comprises nitrogen trifluoride, the method further comprising:

flowing hydrogen with the halogen-containing precursor.

4. The etching method of claim 3, wherein a flow rate of the hydrogen is at least twice a flow rate of the halogen-containing precursor.

5. The etching method of claim 1, wherein the etching method is performed at a temperature greater than or about 150 °C.

6. The etching method of claim 1, wherein a pressure in the semiconductor processing chamber is maintained below or about 15 Torr while flowing the halogen-containing precursor.

7. The etching method of claim 6, wherein a pressure in the semiconductor processing chamber is maintained above or about 15 Torr while flowing the etchant precursor.

8. The etching method claim 1, wherein the substrate may further comprise an exposed region of silicon oxide.

9. The etching method claim 8, wherein a trench is formed through the silicon oxide to define the exposed region of tungsten oxide.

10. The etching method of claim 1,

wherein the plasma effluents are flowed into the processing region of the semiconductor processing chamber at a first pressure in the semiconductor processing chamber;

the exposed region of tungsten oxide overlies a region of tungsten at a base of a trench defined in the substrate, andthe etchant precursor is flowed into the processing region at a second pressure in the semiconductor processing chamber higher than the first pressure.

11. The etching method of claim 10, wherein the halogen-containing precursor comprises fluorine, and wherein the etchant precursor comprises boron trichloride.

12. The etching method of claim 10, further comprising halting plasma formation prior to flowing the etchant precursor.

13 The etching method of claim 10, wherein the halogen-containing precursor comprises nitrogen trifluoride, the method further comprising:

flowing hydrogen with the halogen-containing precursor.

14. The etching method of claim 13, wherein a flow rate of the hydrogen is at least twice a flow rate of the halogen-containing precursor.

15. The etching method of claim 10, wherein a pressure in the semiconductor processing chamber is maintained below or about 15 Torr while flowing the halogen-containing precursor.

16. The etching method of claim 15, wherein a pressure in the semiconductor processing chamber is maintained above or about 15 Torr while flowing the etchant precursor.

17. The etching method of claim 1,

wherein the plasma is a plasma of a fluorine-containing precursor;

the plasma effluents are flowed into the processing region of the semiconductor processing chamber;

the exposed region of tungsten oxide overlies a region of tungsten, the plasma effluents fluorinating the tungsten oxide;

the etchant precursor is a chlorine-containing precursor; and the tungsten oxide is removed.

18. The etching method of claim 17, further comprising:

flowing hydrogen with the fluorine-containing precursor, wherein a flow rate of the hydrogen is at least twice a flow rate of the fluorine-containing precursor.

19. The etching method of claim 17, wherein a pressure in the semiconductor processing chamber is maintained below or about 10 Torr while flowing the fluorine-containing precursor, and wherein a pressure in the semiconductor processing chamber is maintained above or about 20 Torr while flowing the chlorine-containing precursor.