

Claims:

1. ~~A method of forming a tungsten carbide film, comprising:
forming a tungsten carbide initiation layer on a silicon-containing surface of a substrate at a first deposition rate; and
forming a tungsten carbide film on the tungsten carbide initiation layer at a second deposition rate, wherein the second deposition rate is greater than the first deposition rate.~~
2. ~~The method of claim 1, wherein a ratio of the second deposition rate to the first deposition rate is 3:1 or greater.~~
3. ~~The method of claim 2, wherein the second deposition rate is 30 Å/second or greater and the first deposition rate is 10 Å/second or less.~~
4. ~~The method of claim 3, wherein the second deposition rate is in a range of about 30 Å/second to about 40 Å/second and the first deposition rate is in a range of about 5 Å/second to about 10 Å/second.~~
5. ~~The method of claim 1, wherein the tungsten carbide initiation layer has a thickness in a range of about 10 Å to about 200 Å.~~
6. ~~The method of claim 5, wherein the tungsten carbide film has a thickness of about 5,000 Å or greater.~~
7. ~~The method of claim 6, wherein forming the tungsten carbide initiation layer comprises exposing the silicon-containing surface to a first reactive gas comprising WF_6 , C_3H_6 , and optionally H_2 in a first PECVD process including a first RF plasma power of about 100 Watts or less at a first pressure in a first range of about 2 Torr to about 10 Torr.~~

8. ~~The method of claim 7, wherein the WF_6 and C_3H_6 in the first reactive gas are present in a ratio of 2:1 or greater.~~

9. ~~The method of claim 7, wherein forming the tungsten carbide film comprises exposing the tungsten carbide initiation layer to a second reactive gas comprising WF_6 , C_3H_6 , and optionally H_2 in a second PECVD process including a second RF plasma power of about 500 Watts or greater at a second pressure in a second range of about 2 Torr to about 10 Torr.~~

10. ~~The method of claim 1, wherein the silicon-containing surface comprises silicon oxide, silicon nitride, or combinations thereof.~~

11. ~~A method of forming a tungsten carbide film, comprising:~~

~~forming a tungsten carbide initiation layer on a silicon-containing surface of a substrate at a first deposition rate, comprising exposing the silicon-containing surface to a first reactive gas comprising WF_6 , C_3H_6 , and H_2 in a first PECVD process including a first RF plasma power of about 100 Watts or less at a first pressure in a range of about 2 Torr to about 10 Torr; and~~

~~forming a tungsten carbide film on the tungsten carbide initiation layer at a second deposition rate, comprising exposing the tungsten carbide initiation layer to a second reactive gas comprising WF_6 , C_3H_6 , and optionally H_2 in a second PECVD process including a second RF plasma power of about 500 Watts or greater at a second pressure in a range of about 2 Torr to about 10 Torr, wherein the second deposition rate is greater than the first deposition rate.~~

12. ~~The method of claim 11, wherein a ratio of the second deposition rate to the first deposition rate is 3:1 or greater.~~

13. ~~The method of claim 12, wherein the second deposition rate is 30 Å/second or greater and the first deposition rate is 10 Å/second or less.~~

~~14. The method of claim 13, wherein the second deposition rate is in a range of about 30 Å/second to about 40 Å/second and the first deposition rate is in a range of about 5 Å/second to about 10 Å/second.~~

~~15. The method of claim 11, wherein the tungsten carbide initiation layer has a thickness in a range of about 10 Å to about 200 Å.~~

1. An invention not claimed in any divisional application.