

CLAIMS:

1. A method of forming a semiconductor structure, the method comprising:
forming a first silicon oxide layer overlying a semiconductor substrate;
forming a first silicon layer overlying the first silicon oxide layer;
forming a silicon nitride layer overlying the first silicon layer;
5 forming a second silicon layer overlying the silicon nitride layer;
forming a second silicon oxide layer overlying the second silicon layer;
removing the silicon nitride layer;
removing the first silicon layer and the second silicon layer; and
forming a metal layer between each of the first silicon oxide layer and the second
10 silicon oxide layer.
2. The method of forming a semiconductor structure of claim 1, wherein the
silicon nitride layer is removed by a wet etch process.
3. The method of forming a semiconductor structure of claim 1, wherein the
first silicon layer and the second silicon layer are removed by a dry etch process.
- 15 4. The method of forming a semiconductor structure of claim 1, wherein the
second silicon layer and the second silicon oxide layer form a composite film characterized by a
Young's modulus of greater than or about 90 GPa.
5. The method of forming a semiconductor structure of claim 1, wherein the
metal layer comprises tungsten.
- 20 6. The method of forming a semiconductor structure of claim 1, further
comprising:
forming a liner layer along the first silicon oxide layer and the second silicon
oxide layer subsequent removing the first silicon layer and the second silicon layer.
7. The method of forming a semiconductor structure of claim 1, wherein
25 forming the first silicon oxide layer occurs in a first processing chamber, wherein removing the

first silicon layer and the second silicon layer occurs in a second processing chamber, the method further comprising:

transferring the semiconductor substrate from the first processing chamber to the second processing chamber while maintaining vacuum conditions.

5 8. The method of forming a semiconductor structure of claim 1, wherein the first silicon oxide layer and the second silicon oxide layer are characterized by a thickness of less than or about 50 nm.

 9. A method of forming a semiconductor structure, the method comprising:
 forming a first silicon oxide layer overlying a semiconductor substrate;
10 forming a first amorphous silicon layer overlying the first silicon oxide layer;
 forming a silicon nitride layer overlying the first amorphous silicon layer;
 forming a second amorphous silicon layer overlying the silicon nitride layer;
 forming a second silicon oxide layer overlying the second amorphous silicon
layer;
15 removing the silicon nitride layer; and
 converting the first amorphous silicon layer and the second amorphous silicon
layer to a metal material respectively in contact with the first silicon oxide layer and the second
silicon oxide layer.

 10. The method of forming a semiconductor structure of claim 9, wherein the
20 converting comprises:
 flowing a metal-containing precursor to contact the first amorphous silicon layer
and the second amorphous silicon layer; and
 forming a volatile silicon-containing byproduct while forming a layer of the metal
material.

25 11. The method of forming a semiconductor structure of claim 9, further
comprising:
 forming a layer of metal material extending between the first silicon oxide layer
and the second silicon oxide layer.

12. The method of forming a semiconductor structure of claim 9, wherein the silicon nitride layer is removed by a wet etch process.

13. The method of forming a semiconductor structure of claim 9, wherein the first amorphous silicon layer and the second amorphous silicon layer are characterized by a
5 thickness of less than or about 5 nm.

14. A method of forming a semiconductor structure, the method comprising:
forming a first silicon oxide layer overlying a semiconductor substrate, wherein
the first silicon oxide layer comprises a nitrogen dopant or a silicon-rich stoichiometry;
forming a silicon nitride layer overlying the first silicon oxide layer;
10 forming a second silicon oxide layer overlying the silicon nitride layer, wherein
the second silicon oxide layer comprises a nitrogen dopant or a silicon-rich stoichiometry;
removing the silicon nitride layer; and
treating the first silicon oxide layer and the second silicon oxide layer.

15. The method of forming a semiconductor structure of claim 14, wherein the
15 treating comprises performing a steam anneal.

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