WHAT IS CLAIMED IS:

1. A semiconductor wafer processing apparatus comprising:

a wafer handling chamber;

a wafer handling robot;

a first deposition process module;

a cooling stage, and

controls set to sequentially move a wafer comprising a three-dimensional structure from the wafer handling chamber to the first deposition process module, deposit a TiN liner layer on the wafer at a first deposition temperature in the first deposition process module, move the wafer to the cooling stage, cool the wafer to below the first deposition temperature, move the wafer back to a second deposition process module, and deposit a cobalt seed layer over the TiN liner layer on the wafer at a second deposition temperature.

2. The apparatus of Claim 1, wherein the controls are set to, after depositing the cobalt seed layer, move the wafer from the first deposition process module to the cooling stage and cool the wafer to below the second deposition temperature.

3. The apparatus of Claim 1, wherein the cobalt seed layer comprises a nanolaminate.

4. The apparatus of Claim 1, additionally comprising a clustered turbo pump.

5. The apparatus of Claim 1, wherein the controls are set to deposit the TiN liner layer on the wafer in the first deposition process module by atomic layer deposition.

6. The apparatus of Claim 5, wherein the controls are set to deposit the cobalt seed layer on the wafer in the second deposition process module by atomic layer deposition.

7. The apparatus of Claim 1, wherein the first deposition process module and the second deposition process module are the same.

8. A method of cobalt metallization comprising:

depositing a TiN liner layer on a three-dimensional feature on a wafer by atomic layer deposition at a first deposition temperature in a first deposition process module;

cooling the wafer to a temperature below the first deposition temperature;

moving the wafer to a second deposition process module;

depositing a cobalt seed layer directly over and contacting the TiN liner layer by atomic layer deposition at a second deposition temperature in the second deposition process module; and

depositing cobalt over the cobalt seed layer by plating.

9. The method of Claim 8, wherein cooling the wafer to a temperature below the first deposition temperature comprises moving the wafer to a cooling module.

10. The method of Claim 8, wherein cooling the wafer to a temperature below the first deposition temperature comprises placing the wafer on a cooling stage.

11. The method of Claim 8, additionally comprising cooling the wafer to a temperature below the second deposition temperature after depositing the cobalt seed layer and prior to depositing cobalt over the cobalt seed layer by plating.

12. The method of Claim 11, wherein cooling the wafer to a temperature below the second deposition temperature comprises moving the wafer to a cooling module.

13. The method of Claim 8, wherein the first deposition process module and the second deposition process module are the same.

14. The method of Claim 8, wherein the cobalt seed layer comprises a mixture of cobalt and TiN.

15. The method of Claim 14, wherein the cobalt seed layer additionally comprises a cobalt layer over the mixture of cobalt and TiN.

16. The method of Claim 8, wherein the cobalt seed layer comprises a nanolaminate of TiN and cobalt layers.

17. The method of Claim 16, wherein the cobalt seed layer additionally comprises a cobalt layer over the nanolaminate.

18. The method of Claim 8, wherein the cobalt seed layer comprises a graded layer of TiN and cobalt.

19. The method of Claim 18, wherein the graded layer comprises an increasing concentration of cobalt from an interface with the underlying TiN liner layer to the upper surface of the graded layer.

20. The method of Claim 8, additionally comprising exposing the substrate to $TiCl_4$ after depositing the TiN liner layer and prior to depositing the cobalt seed layer.