Claims

1. A method, comprising:

heating a substrate disposed in a process chamber to a temperature ranging from about 150 degrees Celsius to about 650 degrees Celsius;

flowing a silicon-containing precursor into the process chamber;

depositing a first amorphous silicon layer on a bottom of a feature formed in the substrate and a second amorphous silicon layer on a surface of the substrate, a first portion of each sidewall of the feature being in contact with the first amorphous silicon layer and a second portion of each sidewall being exposed; and

removing the second amorphous silicon layer.

2. The method of claim 1, further comprising depositing a third amorphous silicon layer on the first amorphous silicon layer and a fourth amorphous silicon layer on the surface of the substrate.

3. The method of claim 2, further comprising removing the fourth amorphous silicon layer.

4. The method of claim 1, wherein the silicon-containing precursor comprises a silane precursor.

5. The method of claim 1, wherein the first amorphous silicon layer and the second amorphous silicon layer are deposited by a plasma enhanced chemical vapor deposition process.

6. The method of claim 5, wherein a plasma power density of the plasma enhanced chemical vapor deposition process ranges from about 0.14 W/cm2 to about 2.83 W/cm2.

7. The method of claim 1, wherein the depositing and the removing are performed in a single process chamber.

8. The method of claim 1, wherein the removing the second amorphous silicon layer comprises a plasma etch process.

9. The method of claim 8, wherein the plasma etch process utilizes hydrogen gas as an etchant.

10. The method of claim 8, wherein a plasma power density of the plasma etch process ranges from about 0.14 W/cm2 to about 2.83 W/cm2.

11. The method of claim 1, wherein the substrate is heated to a temperature of about 200 degrees Celsius to about 550 degrees Celsius and a plasma is formed in the process chamber.