What is claimed is:

1. A method of forming a film, the method comprising:

performing a deposition cycle comprising:

introducing a hydrocarbon source into a processing chamber, wherein the hydrocarbon source has a carbon to hydrogen atom ratio of greater than 1:2;

introducing a plasma initiating gas into the processing chamber;

generating a plasma in the processing chamber at a temperature of greater than 600 °C;

forming an amorphous carbon layer on a substrate with a deposition rate of greater than 200 nm/hr, the substrate having a substrate surface having at least one feature thereon, the at least one feature extending a feature depth from the substrate surface to a bottom surface, the at least one feature having a width defined by a first sidewall and a second sidewall, wherein the amorphous carbon film is deposited on the substrate surface, the first sidewall, the second sidewall, and the bottom surface of the at least one feature and having a conformality of greater than 30%; and

purging the processing chamber.

2. The method of claim 1, wherein the plasma initiating gas is selected from one or more of hydrogen, helium, argon, and nitrogen.

3. The method of claim 1, further comprising repeating the deposition cycle from 2 to 50 times.

4. The method of claim 1, wherein the amorphous carbon layer is a gap fill layer.

5. The method of claim 1, wherein the amorphous carbon layer is a conformal layer.

6. The method of claim 1, wherein the hydrocarbon source comprises one or more of acetylene, vinylacetylene, benzene, styrene, toluene, xylene, pyridine, acetophenone, phenol, furan, C_3H_2, C_5H_4, monofluorobenzene, difluorobenzene, tetrafluorobenzene, and hexafluorobenzene.

7. The method of claim 1, wherein purging the processing chamber comprises flowing a purge gas into the processing chamber.

8. The method of claim 7, wherein the purge gas comprises an inert gas or a hydrocarbon source gas.

9. The method of claim 1, wherein the feature has an aspect ratio greater than or equal to 10:1.

10. The method of claim 1, wherein the depth of the at least one feature is in a range of 50 nm to 100 nm.

11. The method of claim 1, wherein the substrate comprises a stack of a plurality of alternating layers of an oxide material and a nitride material.

12. The method of claim 1, wherein the at least one feature comprises a memory hole or a word-line slit.

13. A non-transitory computer readable medium including instructions, that, when executed by a controller of a processing chamber, cause the processing chamber to perform the method of any one of claims 1 to 12.