What is claimed is:

1. A method of processing a substrate, comprising:
flowing an argon containing gas into a process chamber;
flowing a nitrogen containing gas into the process chamber;
igniting a plasma in the process chamber;
flowing a precursor gas into the process chamber after igniting the plasma;
performing a deposition process at a temperature of about 560 degrees C to about 700 degrees C; and
forming a nitrogen doped carbon hardmask.

2. The method of claim 1, wherein the argon containing gas is atomic argon.

3. The method of claim 1, wherein the nitrogen containing gas is diatomic nitrogen.

4. The method of claim 1, wherein the argon containing gas and the nitrogen containing gas are introduced simultaneously.

5. The method of claim 1, wherein the nitrogen containing gas has a flow rate of about 350 sccm to about 900 sccm.

6. The method of claim 1, wherein the argon containing gas has a flow rate of about 2000 sccm to about 4000 sccm.

7. The method of claim 1, wherein the nitrogen containing gas to argon containing gas ratio is about 1:3 to about 1:10.

8. The method of claim 1, wherein the pressure during the flowing the argon containing gas and the flowing the nitrogen containing gas is about 6 Torr to about 12 Torr.

9. The method of claim 1, wherein the deposition process is performed at a temperature of about 600 degrees C to about 650 degrees C.

10. The method of claim 9, wherein the radio frequency power is about 2000 Watts to about 5500 Watts.

11. A method of processing a substrate comprising:

flowing an argon containing gas into a process chamber;

flowing a nitrogen containing gas into the process chamber;

applying a radio frequency power to the argon containing gas and the nitrogen containing gas to ignite a plasma;

flowing a precursor gas into the process chamber after igniting the plasma;

performing a deposition process at a temperature of about 560 degrees C to about 700 degrees C; and

forming a nitrogen doped carbon hardmask.

12. The method of claim 11, wherein the precursor gas is a hydrocarbon.

13. The method of claim 12, wherein the precursor gas is any one of acetylene (C_2H_2), methane (CH_4), ethane (C_2H_6), propane (C_3H_8), propene (C_3H_6), cyclopropane (C_3H_6), butane (C_4H_{10}), pentane (C_5H_{12}), hexane (C_6H_{14}), heptane (C_7H_{16}), octane (C_8H_{18}), nonane (C_9H_{20}), decane ($C_{10}H_{22}$), undecane ($C_{11}H_{24}$), or dodecane ($C_{12}H_{26}$).

14. The method of claim 13, wherein the hydrocarbon is propene (C_3H_6).

15. The method of claim 14, wherein the precursor gas is introduced at a flow rate of about 300 sccm to about 800 sccm.

16. The method of claim 11, wherein the deposition process is performed as a deposition rate of about 2500 Angstroms/minute to about 8000 Angstroms/minute.

17. The method of claim 11, wherein the argon containing gas is atomic argon.

18. The method of claim 11, wherein the nitrogen containing gas is diatomic nitrogen.

19. A semiconductor device, comprising:

a substrate;

a nitrogen-doped carbon hardmask disposed on the substrate, wherein the nitrogen-doped carbon hardmask has a thickness of about 0.5 um to about 6 um, an atomic nitrogen composition of about 1% nitrogen to about 16% nitrogen, an internal stress of about 30 MPa to about 37 MPa, an edge drop of about 55 nm to about 25 nm, and a thickness profile uniformity of less than about 3%.

20. The semiconductor device of claim 19, wherein the atomic nitrogen composition is about 5% to about 16%.