What is claimed is:

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

exposing a substrate to a first carbon precursor to form a first precursor terminated surface on the substrate; and

exposing the first precursor terminated surface to a second carbon precursor to form a conformal carbon polymer film on the substrate, and

annealing the carbon polymer film at a temperature of 300° C to 400° C, wherein annealing the carbon polymer film causes the carbon polymer film to decrease in thickness less than 20%,

wherein the first carbon compound comprises 1,4-phenylene diisocyanate (DIC), and

wherein the second carbon compound comprises one or more of ethylene diamine (EDA) or phenylene diamine (PDA).

2. The method of claim 1, wherein the carbon polymer film is an alternating copolymer.

3. The method of claim 1 or 2, wherein the carbon polymer film has a carbon content in the range of 40% to 90%, a nitrogen content in the range of 2% to 40% and an oxygen content in the range of 1% to 20%.

4. The method of any one of claims 1 to 3, wherein the substrate surface comprises one or more of silicon (Si), silicon nitride (SiN) or copper (Cu).

5. The method of any one of claims 1 to 4, wherein the substrate surface is pre-treated to form amine terminations.

6. The method of any one of claims 1 to 5, wherein the first precursor terminated surface comprises isocyanate terminations.

7. The method of any one of claims 1 to 6, wherein the substrate comprises one or more surface features having an aspect ratio greater than 5:1 and the carbon polymer film is a conformal film.

8. The method of any one of claims 1 to 7, further comprising exposing the carbon polymer film to a plasma treatment to enhance thermal stability of the carbon polymer film.

9. The method of any one of claims 1 to 8, wherein the substrate is maintained at a temperature less than 100 ºC.

10. A non-transitory computer readable medium including instructions, that, when executed by a controller of a processing chamber, causes the processing chamber to perform the method of any one of claims 1 to 9.

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