What is claimed is

1. A method of forming an etching mask, or a portion thereof for lithography in a semiconductor production process, the etching mask having its smallest feature at a substrate plane, implemented in a microreactor direct atomic layer deposition (μDALP) system, the method comprising:

a. using the μDALP system, depositing and/or removing a first strip; and

b. using the μDALP system, respectively depositing and/or removing a second strip, wherein:

the first and second strips are configured to form a crossing pattern with a predetermined overlap region; and the crossing pattern adapted, sized, and configured to form two acute angles with the smallest feature defined at one of the two acute angles formed by the first strip and the second strip forming at least the portion of the etching mask.

2. The method of claim 1, wherein:

a. the step of depositing the first strip comprises depositing a first material configured to form a film having predetermined thickness; and

b. the step of depositing the second strip comprises depositing a second material configured to form a film having predetermined thickness.

3. The method of claim 2, wherein the first and/or second material forming the first strip and/or the second strip respectively is resistant to an etching process.

4. The method of claim 2, wherein the first and/or second material forming the first strip and/or the second strip respectively is sensitive to an etching process.

5. The method of claim 1, wherein the lithography is selected from the group consisting of: photolithography, Extreme Ultraviolet Lithography (EUV), e-beam lithography, nanoimprint lithography, x-ray lithography, focused ion-beam lithography (FIB), scanning probe lithography, directed self-assembly (DSA) lithography, or a lithography process comprising one or more of the foregoing.

6. The method of claim 5, wherein the etching process is selected from the group consisting of: reactive ion etching (RIE), deep reactive ion etching (DRIE), ion beam etching (IBE), chemical vapor etching (CVE), wet chemical etching, plasma etching, laser ablation, electron beam etching, and photolithography-assisted etching.

7. The method of claim 1, wherein the first strip is deposited and/or removed in parallel with the substrate plane.

8. The method of claim 1, further comprising exposing the substrate to an ultraviolet (UV) light source at a wavelength operable to develop the etching mask after depositing and/or removing the material.

9. The method of claim 1, wherein the at least one material deposited or removed in the first strip and second strip comprises a photosensitive material.

10. The method of claim 1, wherein the at least one material deposited and/or removed comprises a chemical vapor deposition (CVD) precursor or a plasma-enhanced atomic layer deposition (PEALD) precursor.

11. The method of claim 1, further comprising using the μDALP system to deposit an antireflective coating (ARC) layer on the substrate prior to depositing and/or removing the material.

12. The method of claim 1, wherein the step of depositing and/or removing the first strip, and the step of respectively depositing and/or removing the second film strip, configured to form a predetermined pattern of crossed film strips, each pattern comprised of a plurality of first strip material, crossed by a plurality of second strip material.

13. The method of claim 1, further comprising exposing the substrate to a photoresist before depositing and/or removing the material, and using the photoresist as a patterned mask for depositing and/or removing the material.

14. The method of claim 1, wherein the crossing pattern is configured to form an alignment marking on the substrate for the etching mask.

15. The method of claim 2, further comprising:

a) using a first etchant, removing the second strip and a first portion of the substrate at a predetermined first rate ratio; and

b) using a second etchant, removing the second strip and a second portion of the substrate at a predetermined second rate ratio.

16. The method of claim 15, wherein the etching rate of the first strip is faster than the etching rate of the substrate.

17. The method of claim 15, wherein the etching rate of the first strip is slower than the etching rate of the substrate.

18. The method of claim 15, wherein the etching rate of the first strip is the same as the etching rate of the substrate.

19. The method of claim 15, wherein the etching rate of the second strip is faster than the etching rate of the substrate.

20. The method of claim 15, wherein the etching rate of the second strip is slower than the etching rate of the substrate.

21. The method of claim 15, wherein the etching rate of the second strip is same as the etching rate of the substrate.

22. The method of claim 15, wherein the step of removing the second strip and the first portion of the substrate, and the step of removing the first strip and the second portion of the substrate are performed using the same etching process.

23. The method of claim 15, wherein the step of removing the second strip and the first portion of the substrate, and the step of removing the first strip and the second portion of the substrate are performed using a different etching process.