WHAT IS CLAIMED IS:

1. An imprint lithography template comprising a porous material defining a multiplicity of pores with an average pore size of less than 1 nm, wherein a porosity of the porous material is at least 10%.

2. The template of claim 1, wherein the average pore size is at least 0.4 nm.

3. The template of claim 1, wherein the average pore size is larger than a pore size of fused silica.

4. The template of claim 1, wherein the porosity of the porous material is at least 20%.

5. The template of claim 1, wherein the porous material is an organosilicate low-k material.

6. The template of claim 5, wherein a relative porosity of the porous material with respect to fused silica is at least 20%.

7. The template of claim 1, wherein the porous material has a Young's modulus of at least 2 GPa.

8. The template of claim 1, wherein the porous material has a Young's modulus of at least 5 GPa.

9. The template of claim 1, wherein the porous material has a Young's modulus of at least 10 GPa.

10. The template of claim 1, wherein the porous material is positioned between a base layer and a cap layer.

11. The template of claim 10, wherein the base layer comprises fused silica.

12. The template of claim 10, wherein the base layer comprises recesses, and wherein the porous material is positioned in the recesses.

13. The template of claim 10, wherein the cap layer comprises SiO_x, wherein $1 \leq x \leq 2$.

14. The template of claim 10, wherein a thickness of the cap layer is less than 100 nm.

15. The template of claim 14, wherein a thickness of the cap layer is less than 50 nm.

16. The template of claim 15, wherein a thickness of the cap layer is less than 20 nm.

17. The template of claim 10, further comprising protrusions extending from the cap layer.

18. An imprint lithography imprinting stack comprising a porous material defining a multiplicity of pores with an average pore size of less than 1 nm, wherein a porosity of the porous material is at least 10%.

19. The imprinting stack of claim 18, wherein the average pore size is at least-0.4 nm.

20. The imprinting stack of claim 18, wherein the average pore size is larger than a pore size of fused silica.

21. The imprinting stack of claim 18, wherein the porosity of the porous material is at least 20%.

22. The imprinting stack of claim 18, wherein the porous material is an organosilicate low-k material.

23. The imprinting stack of claim 22, wherein a relative porosity of the porous material with respect to fused silica is at least 20%.

24. The imprinting stack of claim 18, wherein the porous material has a Young's modulus of at least 2 GPa.

25. The imprinting stack of claim 18, wherein the porous material has a Young's modulus of at least 5 GPa.

26. The imprinting stack of claim 18, wherein the porous material has a Young's modulus of at least 10 GPa.

27. The imprinting stack of claim 18, wherein the porous material is positioned between a substrate and a cap layer.

28. A method of forming an imprint lithography template, the method comprising:

forming a porous layer on a base layer; wherein the porous layer defines a multiplicity of pores with an average pore size of less than 1 nm, and wherein a porosity of the porous layer is at least 10%, and

forming a cap layer on the porous layer.

29. A method of forming an imprint lithography template, the method comprising:

forming a multiplicity of recesses in a base layer;

depositing a porous material in the recesses, wherein the porous material defines a multiplicity of pores with an average pore size of less than 1 nm, and wherein a porosity of the porous material is at least 10%; and

forming a cap layer on the base layer.

30. A method of forming an imprint lithography stack, the method comprising:

forming a porous layer on a substrate, wherein the porous layer defines a multiplicity of pores with an average pore size of less than 1 nm, and wherein a porosity of the porous layer is at least 10%; and

forming a cap layer on the base layer.

31. An imprint lithography method, comprising:

applying a polymerizable material to an imprinting stack;

contacting the polymerizable material with a template, wherein the template comprises a porous material defining a multiplicity of pores with an average pore size of less than 1 nm, and wherein a porosity of the porous material is at least 10%;

solidifying the polymerizable material; and

separating the template from the solidified material.

32. An imprint lithography method, comprising:

applying drops of a polymerizable material to an imprinting stack, wherein the imprinting stack comprises a porous material defining a multiplicity of pores with an average pore size of ~~at~~ less than 1 nm, and wherein a porosity of the porous material is at least 10%;

contacting the polymerizable material with a template;

solidifying the polymerizable material; and

separating the template from the solidified material.

33. An imprint lithography method comprising:

dispensing drops of a polymerizable material on a surface of a porous imprinting stack, wherein the porous imprinting stack comprises a porous material defining a multiplicity of pores with an average pore size of less than 1 nm, and wherein a porosity of the porous material is at least 10%;

contacting the polymerizable material with a template; and

allowing the polymerizable material to spread to form a substantially continuous layer on the surface of the porous imprinting stack, wherein the spreading of the polymerizable material to form the substantially continuous layer occurs in 80% or less of the time required for a similar distribution of a similar polymerizable material to form a substantially continuous

layer between a second template and a second imprinting stack, wherein the second template and the second imprinting stack have an average pore size of less than 0.4 nm.

34. An imprint lithography method comprising:

dispensing drops of a polymerizable material on a surface of an imprinting stack;

contacting the polymerizable material with a template, wherein the template comprises a porous material defining a multiplicity of pores with an average pore size of less than 1 nm, and wherein a porosity of the porous material is at least 10%; and

allowing the polymerizable material to spread to form a substantially continuous layer on the surface of the porous imprinting stack, wherein the spreading of the polymerizable material to form the substantially continuous layer occurs in 80% or less of the time required for a similar distribution of a similar polymerizable material to form a substantially continuous layer between a second template and a second imprinting stack, wherein the second template and the second imprinting stack have an average pore size of less than 0.4 nm.

Claims:

1. An imprint lithography template comprising a porous material defining a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, wherein a porosity of the porous material is at least about 10%.

2. The template of claim 1, wherein the average pore size is at least about 0.5 nm.

3. The template of claim 1, wherein the porosity of the porous material is at least about 20%.

4. The template of claim 1, wherein the porous material is an organosilicate low-k material.

5. The template of claim 4, wherein a relative porosity of the porous material with respect to fused silica is at least about 20%.

6. The template of claim 1, wherein the porous material has a Young's modulus of at least about 2 GPa.

7. The template of claim 1, wherein the porous material has a Young's modulus of at least about 5 GPa.

8. The template of claim 1, wherein the porous material has a Young's modulus of at least about 10 GPa.

9. The template of claim 1, wherein the porous material is positioned between a base layer and a cap layer.

10. The template of claim 9, wherein the base layer comprises fused silica.

11. The template of claim 9, wherein the base layer comprises recesses, and wherein the porous material is positioned in the recesses.

12. The template of claim 9, wherein the cap layer comprises SiOx, wherein 1 <x <2.

13. The template of claim 9, wherein a thickness of the cap layer is less than about 100 nm.

14. The template of claim 13, wherein a thickness of the cap layer is less than about 50 nm.

15. The template of claim 14, wherein a thickness of the cap layer is less than about 20 nm.

16. The template of claim 9, further comprising protrusions extending from the cap layer.

17. An imprint lithography imprinting stack comprising a porous material defining a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, wherein a porosity of the porous material is at least about 10%.

18. The imprinting stack of claim 17, wherein the average pore size is at least about 0.5 nm.

19. The imprinting stack of claim 17, wherein the porosity of the porous material is at least about 20%.

20. The imprinting stack of claim 17, wherein the porous material is an organosilicate low-k material.

21. The imprinting stack of claim 20, wherein a relative porosity of the porous material with respect to fused silica is at least about 20%.

22. The imprinting stack of claim 17, wherein the porous material has a Young's modulus of at least about 2 GPa.

23. The imprinting stack of claim 17, wherein the porous material has a Young's modulus of at least about 5 GPa.

24. The imprinting stack of claim 17, wherein the porous material has a Young's modulus of at least about 10 GPa.

25. The imprinting stack of claim 17, wherein the porous material is positioned between a substrate and a cap layer.

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26. A method of forming an imprint lithography template, the method comprising: forming a porous layer on a base layer; wherein the porous layer defines a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, and wherein a porosity of the porous layer is at least about 10% , and forming a cap layer on the porous layer.

27. A method of forming an imprint lithography template, the method comprising: forming a multiplicity of recesses in a base layer; depositing a porous material in the recesses, wherein the porous material defines a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, and wherein a porosity of the porous material is at least about 10%; and forming a cap layer on the base layer.

28. A method of forming an imprint lithography stack, the method comprising: forming a porous layer on a substrate, wherein the porous layer defines a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, and wherein a porosity of the porous layer is at least about 10%; and forming a cap layer on the porous layer.

29. An imprint lithography method, comprising: applying a polymerizable material to an imprinting stack; contacting the polymerizable material with a template, wherein the template comprises a porous material defining a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, and wherein a porosity of the porous material is at least about 10%; solidifying the polymerizable material; and separating the template from the solidified material.

30. An imprint lithography method, comprising: applying drops of a polymerizable material to an imprinting stack, wherein the imprinting stack comprises a porous material defining a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, and wherein a porosity of the porous material is at least about 10%; contacting the polymerizable material with a template; solidifying the polymerizable material; and separating the template from the solidified material.

31. An imprint lithography method comprising: dispensing drops of a polymerizable material on a surface of a porous imprinting stack, wherein the porous imprinting stack comprises a porous material defining a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, and wherein a porosity of the porous material is at least about 10%; contacting the polymerizable material with a template; and allowing the polymerizable material to spread to form a substantially continuous layer on the surface of the porous imprinting stack, wherein the spreading of the polymerizable material to form the substantially continuous layer occurs in about 80% or less of the time required for a similar distribution of a similar polymerizable material to form a substantially continuous layer between a second template and a second imprinting stack, wherein the second template and the second imprinting stack have an average pore size of less than about 0.4 nm.

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32. An imprint lithography method comprising: dispensing drops of a polymerizable material on a surface of an imprinting stack; contacting the polymerizable material with a template, wherein the template comprises a porous material defining a multiplicity of pores with an average pore size of 0.4 nm to 1 nm, and wherein a porosity of the porous material is at least about 10%; and allowing the polymerizable material to spread to form a substantially continuous layer on the surface of the imprinting stack, wherein the spreading of the polymerizable material to form the substantially continuous layer occurs in about 80% or less of the time required for a similar distribution of a similar polymerizable material to form a substantially continuous layer between a second template and a second imprinting stack, wherein the second template and the second imprinting stack have an average pore size of less than about 0.4 nm.

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