Claims

1. A method of fabricating a meta-lens structure, the method comprising:

   forming a first dielectric layer in contact with a silicon wafer;

   forming a second dielectric layer in contact with the first dielectric layer, a refractive index of the second dielectric layer different from a refractive index of the first dielectric layer;

   patterning the second dielectric layer; ~~and~~

   removing at least a portion of the silicon wafer to expose the first dielectric layer;

   wherein the silicon wafer is entirely removed;

   wherein the method further comprises forming a layer of silicon oxide in contact with the second dielectric layer after the second dielectric layer is patterned and before the silicon wafer is entirely removed; and

   wherein the method also comprises bonding a wafer to the silicon oxide layer after the silicon oxide layer is formed, and before the silicon wafer is entirely removed.

2. The method according to claim 1,

   wherein the refractive index of the second dielectric layer is greater than the refractive index of the first dielectric layer.

3. The method according to claim 1,

   wherein the first dielectric layer includes one or more first sub-layers of a first material and one or more second sublayers of a second material.

4. The method according to claim 3,

wherein a first sub-layer of the one or more first sub-layers has a first surface in contact with a second sub-layer of the one or more second sub-layers, and a second surface opposite the first in contact with another second sub-layer of the one or more second sub-layers.

5. The method according to claim 3,

wherein the first material is silicon oxide, and the second material is silicon nitride.

6. The method according to claim 1,

wherein the first dielectric layer comprises any one material selected from a group consisting of silicon oxide, silicon nitride, and aluminum nitride.

7. The method according to claim 1,

wherein the second dielectric layer comprises any one material selected from a group consisting of titanium oxide, amorphous silicon, silicon nitride, and aluminum nitride.

8. The method according to claim 1,

wherein patterning the second dielectric layer comprises forming or providing a mask over the second dielectric layer, and removing the exposed portions of the second dielectric layer via etching.

9. The method according to claim 1, further comprising:

forming a patterned layer on a surface of the silicon wafer opposite another surface of the silicon wafer the first dielectric layer is in contact with; and

removing the portion of the silicon wafer exposed through the patterned layer while a further portion of the silicon wafer covered by the patterned layer remains in contact with the first dielectric layer.

10. The method according to claim 9,

wherein removing the portion of the silicon wafer exposes a portion of the first dielectric layer.

11. The method according to claim 9,

wherein the portion of the silicon wafer is removed via etching.

~~The method according to claim 1,~~

~~wherein the silicon wafer is entirely removed;~~

~~wherein the method further comprises forming a layer of silicon oxide in contact with the second dielectric layer after the second dielectric layer is patterned and before the silicon wafer is entirely removed; and~~

~~wherein the method also comprises bonding a wafer to the silicon oxide layer after the silicon oxide layer is formed, and before the silicon wafer is entirely removed.~~

~~13.~~12. The method according to claim 1~~2~~,

wherein the layer of silicon oxide is also in contact with exposed portions of the first dielectric layer.

~~14.~~13. The method according to claim 1~~2~~,

wherein the wafer is configured to allow visible light to pass through.

~~15.~~14. The method according to claim 1~~2~~,
wherein the wafer comprises glass, silica, or quartz.

~~16.~~15. The method according to claim 1~~2~~,
wherein bonding the wafer to the silicon oxide layer comprises anodic bonding or fusion bonding.

~~17.~~16. The method according to claim 1~~2~~, further comprising:
removing a portion of the first dielectric layer to planarize a surface of the first dielectric layer via chemical mechanical polishing to form a meta-lens layer.

~~18.~~17. The method according to claim 1~~7~~6, further comprising:
forming one or more further meta-lens layers over the meta-lens layer.

~~19.~~18. The method according to claim 1~~7~~6,
wherein the meta-lens layer is in contact with a first surface of the wafer; and
wherein the method also comprises forming a further meta-lens layer in contact with a second surface of the wafer opposite the first surface.

~~20.~~19. A meta-lens structure formed by the method according to claim 1.