Claims

1. A photolithography method, wherein the method comprises:

providing a substrate, forming a negative photoresist layer on the substrate using a negative photoresist, and forming a positive photoresist layer on the negative photoresist layer using a positive photoresist;

patterning the negative photoresist layer and the positive photoresist layer to form a positive pattern region on the positive photoresist layer and a negative pattern region on the negative photoresist layer, wherein a size of the positive pattern region is larger than a size of the negative pattern region;

developing the positive photoresist layer with developer for positive photoresist to remove the positive photoresist in the positive pattern region; and

developing the negative photoresist layer with developer for negative photoresist to remove the negative photoresist located near the negative pattern region, thereby providing an exposed region associated with a size of the positive pattern region and a size the negative pattern region, to expose the substrate.

2. The photolithography method of claim 1, wherein

after forming the negative photoresist layer and before forming the positive photoresist layer, forming a interlayer between the negative photoresist layer and the positive photoresist layer.

3. The photolithography method of claim 2, wherein

developing the interlayer with developer for interlayer, or etching the interlayer with a pattern of the developed positive photoresist layer as an anti-etching mask, so that the pattern of the interlayer matches pattern of the developed positive photoresist layer.

4. The photolithography method of claim 1, wherein

under an exposure source, the positive photoresist layer and the negative photoresist layer are exposed by using a lithographic mask with a template pattern or by focused direct writing, thereby forming a positive pattern region on the positive photoresist layer and a negative pattern region on the negative photoresist layer.

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

forming a pattern on the substrate through material deposition technology or etching technology.

6. The photolithography method of claim 4, wherein

the wavelength of the exposure source is 1 to 500 nm, and the temperature for the drying after the exposure is 30 to 300 ℃.

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

a step of thermally evaporating a chromium film at a rate of 1 Å/s and thermally evaporating a gold film at a rate of 0.5 Å/s, wherein the chromium film is used as an adhesion layer for the gold film.

8. The photolithography method of claim 1, wherein

the positive photoresist and the negative photoresist respond differently to exposure flux at specific wavelengths.

9. The photolithography method of claim 1, wherein

the material of the substrate includes semiconductor, metal, insulator, polymer or composite material.

10. The photolithography method of claim 2, wherein

the interlayer comprises an inorganic substance, a polymer, or a composite material.

11. A photolithography method, wherein the method comprises:

providing a substrate, forming a positive photoresist layer on the substrate using a positive photoresist, forming an interlayer on the positive photoresist layer and forming a negative photoresist layer on the interlayer using a

negative photoresist.

patterning the negative photoresist layer and the positive photoresist layer to form a positive pattern region on the positive photoresist layer and a negative pattern region on the negative photoresist layer, wherein a size of the positive pattern region is larger than a size of the negative pattern region;

developing the negative photoresist layer with developer for negative photoresist to remove the negative photoresist outside the nagative pattern region;

developing the interlayer with developer for interlayer, or etching the interlayer with a pattern of the developed negative photoresist layer as an anti-etching mask, so that the pattern of the interlayer matches pattern of the developed negative photoresist layer; and

developing the positive photoresist layer with developer for positive photoresist to remove the positive photoresist at an edge portion of the positive pattern region, thereby providing an exposed region associated with a size of the positive pattern region and a size of the negative pattern region, to expose the substrate.

12. The photolithography method of claim 11, wherein

under an exposure source, the positive photoresist layer and the negative photoresist layer are exposed by using a lithographic mask with a template pattern or by focused direct writing, thereby forming a positive pattern region on the positive photoresist layer and a negative pattern region on the negative photoresist layer.

13. The method according to claim 11, further comprising:

forming a pattern on the substrate through material deposition technology or etching technology.

14. The photolithography method of claim 12, wherein

the wavelength of the exposure source is 1 to 500 nm, and the temperature

for the drying after the exposure is 30 to 300 ℃.

15. The method according to claim 11, further comprising:

a step of thermally evaporating a chromium film at a rate of 1 Å/s and thermally evaporating a gold film at a rate of 0.5 Å/s, wherein the chromium film is used as an adhesion layer for the gold film.

16. The photolithography method of claim 11, wherein

the positive photoresist and the negative photoresist respond differently to exposure flux at specific wavelengths.

17. The photolithography method of claim 11, wherein

the material of the substrate includes semiconductor, metal, insulator, polymer or composite material.

18. The photolithography method of claim 11, wherein

the interlayer comprises an inorganic substance, a polymer, or a composite material.