

CLAIMS

1. A semiconductor structure processing method, comprising:

providing a semiconductor substrate, which is provided with feature portions having a mask layer on their top surfaces;

ashing a semiconductor structure comprising the semiconductor substrate, the feature portions and the mask layer;

removing the mask layer;

cleaning the semiconductor structure, and forming an oxide layer on surfaces of the feature portions after the feature portions are cleaned;

drying the semiconductor structure;

performing a compensation treatment of the oxide layer to increase a thickness of the oxide layer; and

removing the oxide layer,

wherein during drying, one feature portion of at least one group of adjacent feature portions inclines towards another feature portion adjacent thereto, and a distance between said one inclined feature portion and the other feature portion adjacent thereto after drying is smaller than a distance therebetween before drying.

2. The semiconductor structure processing method of claim 1, wherein ashing the semiconductor structure comprises:

ashing the semiconductor structure by using an oxygen-free first mixed gas.

3. The semiconductor structure processing method of claim 2, wherein the first mixed gas at least comprises hydrogen and nitrogen.

4. The semiconductor structure processing method of claim 1, wherein ashing the semiconductor structure comprises:

ashing the semiconductor structure by using a second mixed gas which contains oxygen.

5. The semiconductor structure processing method of claim 4, wherein the second mixed gas at least comprises hydrogen, nitrogen and oxygen.

6. The semiconductor structure processing method of claim 1, wherein a mixed liquid of NH_4OH , H_2O_2 and H_2O is used in the cleaning, and a volume ratio of NH_4OH , H_2O_2 and H_2O satisfies $\text{NH}_4\text{OH}:\text{H}_2\text{O}_2:\text{H}_2\text{O}=1:1\sim4:20\sim100$.

7. The semiconductor structure processing method of claim 1, wherein drying the semiconductor structure comprises:

drying the surfaces of the feature portions by using isopropanol at a first temperature;
and

drying the bottom of the semiconductor substrate by using deionized water at a second temperature while drying the surfaces of the feature portions.

8. The semiconductor structure processing method of claim 7, wherein the first temperature is in a range of $60\sim80^\circ\text{C}$, and the second temperature is in a range of $60\sim80^\circ\text{C}$.

9. The semiconductor structure processing method of claim 1, wherein performing the compensation treatment of the oxide layer comprises:

performing the compensation treatment of the oxide layer by using a third mixed gas which at least comprises hydrogen, nitrogen and oxygen.

10. The semiconductor structure processing method of claim 1, wherein performing the compensation treatment of the oxide layer comprises:

performing the compensation treatment of the oxide layer by using mixed plasma which at least comprises plasma of hydrogen, nitrogen and oxygen.

11. The semiconductor structure processing method of claim 1, wherein removing the oxide layer comprises:

supplying a chemical gas to the oxide layer to react with the oxide layer at a third temperature; and

after the reaction, performing a thermal treatment of the oxide layer at a fourth temperature, and supplying a carrier gas to the oxide layer at the same time to remove the oxide layer by evaporation.

12. The semiconductor structure processing method of claim 11, wherein the third temperature is in a range of 30~150°C, and the fourth temperature is in a range of 100~200°C.

13. The semiconductor structure processing method of claim 11, wherein an etching selection ratio of the chemical gas to the mask layer and the feature portions is more than 500:1.

14. The semiconductor structure processing method of claim 13, wherein the chemical gas at least comprises ammonia and hydrogen fluoride, and the carrier gas at least comprises nitrogen or argon.

15. The semiconductor structure processing method of claim 1, wherein an aspect ratio of the feature portions disposed on the semiconductor substrate is 10.

16. A semiconductor structure forming method, comprising:

providing a semiconductor substrate and a mask layer on the semiconductor substrate;

etching the semiconductor substrate to form discrete feature portions by taking the mask layer as a mask;

ashing a semiconductor structure comprising the semiconductor substrate, the feature portions and the mask layer;

removing the mask layer;

cleaning and drying the semiconductor structure in sequence, wherein an oxide layer is formed on a surface of the semiconductor structure after the semiconductor structure is cleaned;

performing a compensation treatment of the oxide layer to increase a thickness of the oxide layer; and

removing the oxide layer.

17. The semiconductor structure forming method of claim 16, wherein an aspect ratio of the formed feature portions is 10.

18. The semiconductor structure forming method of claim 16, wherein performing the compensation treatment of the oxide layer comprises:

performing the compensation treatment of the oxide layer by using a third mixed gas which at least comprises hydrogen, nitrogen and oxygen.

19. The semiconductor structure forming method of claim 16, wherein performing the compensation treatment of the oxide layer comprises:

performing the compensation treatment of the oxide layer by using mixed plasma which at least comprises plasma of hydrogen, nitrogen and oxygen.