WHAT IS CLAIMED IS:

1. A method for manufacturing a semiconductor device comprising a semiconductor film over a substrate, comprising the steps of:

forming a first conductor over the substrate;

forming a first insulator over the first conductor;

forming a first hard mask over the first insulator;

forming a first resist mask comprising a first opening, over the first hard mask;

etching the first hard mask using the first resist mask to form a second hard mask comprising a second opening;

etching the first insulator using the second hard mask to form a second insulator comprising a third opening;

forming a second conductor embedded in the second opening and the third opening;

performing polishing treatment on the second hard mask and the second conductor to form a third conductor embedded in the third opening;

forming a fourth conductor over the second insulator and the third conductor;

forming a second resist mask in a pattern over the fourth conductor;

etching the fourth conductor using the second resist mask and an etching gas to form a fifth conductor; and

removing the second resist mask,

wherein the second hard mask is etched with the etching gas.

2. The method for manufacturing a semiconductor device, according to claim 1, wherein the second hard mask and the fourth conductor comprise the same kind of metal element.

3. The method for manufacturing a semiconductor device, according to claim 1,

wherein the first hard mask comprises a third hard mask and a fourth hard mask over the third hard mask,

wherein the third hard mask is a conductor, and

wherein the fourth hard mask is an insulator.

4. The method for manufacturing a semiconductor device, according to claim 3, wherein the third hard mask and the fourth conductor comprise the same kind of metal element.

5. The method for manufacturing a semiconductor device, according to claim 1,

wherein the fourth conductor comprises a plurality of stacked conductive films, and

wherein a lowermost conductive film of the fourth conductor and the second hard mask are etched with the etching gas.

6. The method for manufacturing a semiconductor device, according to claim 5, wherein the second hard mask and the lowermost conductive film of the fourth conductor comprise the same kind of metal element.

7. The method for manufacturing a semiconductor device, according to claim 1, wherein a region of the second hard mask not overlapping with the second resist mask is removed when etching the fourth conductor, so that a region of the second hard mask remains only in a region overlapping with the fifth conductor.

8. A method for manufacturing a semiconductor device comprising the steps of:

forming a first conductor over a semiconductor substrate;

forming a first insulator over the first conductor;

forming a first hard mask over the first insulator;

forming a first resist mask comprising a first opening, over the first hard mask;

etching the first hard mask using the first resist mask to form a second hard mask comprising a second opening;

etching the first insulator using the second hard mask to form a second insulator comprising a third opening;

forming a second conductor embedded in the second opening and the third opening;

performing polishing treatment on the second hard mask and the second conductor to form a third conductor embedded in the third opening;

forming a fourth conductor over the second insulator and the third conductor;

forming a second resist mask in a pattern over the fourth conductor;

etching the fourth conductor using the second resist mask and a first etching gas to form a fifth conductor;

removing the second resist mask,

forming an oxide semiconductor film over the fifth conductor;

forming a sixth conductor over the oxide semiconductor film;

forming a third insulator over the sixth conductor;

forming a third hard mask over the third insulator;

forming a third resist mask comprising a fourth opening, over the third hard mask;

etching the third hard mask using the third resist mask to form a fourth hard mask comprising a fifth opening;

etching the third insulator using the fourth hard mask to form a fourth insulator comprising a sixth opening;

forming a seventh conductor embedded in the fifth opening and the sixth opening;

performing polishing treatment on the fourth hard mask and the seventh conductor to form an eighth conductor embedded in the sixth opening;

forming a ninth conductor over the fourth insulator and the eighth conductor;

forming a fourth resist mask in a pattern over the ninth conductor;

etching the ninth conductor using the fourth resist mask and a second etching gas to form a tenth conductor; and

removing the fourth resist mask,

wherein the second hard mask is etched with the first etching gas,

wherein the fourth hard mask is etched with the second etching gas, and

wherein a melting point of the tenth conductor is lower than a melting point of the fifth conductor.

9. The method for manufacturing a semiconductor device, according to claim 8,

wherein the second hard mask and the fourth conductor comprise the same kind of metal element, and

wherein the fourth hard mask and the ninth conductor comprise the same kind of metal element.

10. The method for manufacturing a semiconductor device, according to claim 8,

wherein the first hard mask comprises a fifth hard mask and a sixth hard mask over the fifth hard mask,

wherein the fifth hard mask is a conductor,

wherein the sixth hard mask is an insulator,

wherein the third hard mask comprises a seventh hard mask and an eighth hard mask over the seventh hard mask,

wherein the seventh hard mask is a conductor, and

wherein the eighth hard mask is an insulator.

11. The method for manufacturing a semiconductor device, according to claim 10,

wherein the fifth hard mask and the fourth conductor comprise the same kind of metal element, and

wherein the seventh hard mask and the ninth conductor comprise the same kind of metal element.

12. The method for manufacturing a semiconductor device, according to claim 8,

wherein the fourth conductor comprises a plurality of stacked conductive films,

wherein a lowermost conductive film of the fourth conductor and the second hard mask are etched with the first etching gas,

wherein the ninth conductor comprises a plurality of stacked conductive films, and

wherein a lowermost conductive film of the ninth conductor and the fourth hard mask are etched with the second etching gas.

13. The method for manufacturing a semiconductor device, according to claim 12,

wherein the second hard mask and the lowermost conductive film of the fourth conductor comprise the same kind of metal element, and

wherein the fourth hard mask and the lowermost conductive film of the ninth conductor comprise the same kind of metal element.

14. A method for manufacturing a semiconductor device comprising the steps of:

forming a first insulator;

forming a first mask comprising a first opening, over the first insulator;

etching the first insulator using the first mask to form a second insulator comprising a second opening;

forming a first conductor over the first mask and in the first opening and the second opening;

performing polishing treatment on the first mask and the first conductor to form a second conductor;

forming a third conductor over the second insulator and the second conductor;

forming a second mask in a pattern over the third conductor; and

etching the third conductor using the second mask to form a fourth conductor,

wherein the first mask is etched by the step of etching the third conductor, and

wherein the first mask comprises metal element.

15. The method for manufacturing a semiconductor device, according to claim 14, further comprising a step of;

forming a conductive layer under the first insulator,

wherein the second conductor is in contact with the conductive layer through the second opening.

16. The method for manufacturing a semiconductor device, according to claim 14, wherein the first mask and the third conductor comprise the same kind of metal element.

17. The method for manufacturing a semiconductor device, according to claim 14, wherein the polishing treatment is performed using chemical mechanical polishing method.

18. The method for manufacturing a semiconductor device, according to claim 14, wherein a region of the first mask is removed when etching the third conductor, so that a region of the first mask remains only in a region overlapping with the fourth conductor.

19. A method for manufacturing a semiconductor device comprising a semiconductor film over a substrate, comprising the steps of:

forming a first conductor over the substrate;

forming a first insulator over the first conductor;

forming a first hard mask over the first insulator;

forming a first resist mask comprising a first opening, over the first hard mask;

etching the first hard mask using the first resist mask to form a second hard mask comprising a second opening;

etching the first insulator using the second hard mask to form a second insulator comprising a third opening;

forming a second conductor embedded in the second opening and the third opening;

performing polishing treatment on the second hard mask and the second conductor to form a third conductor embedded in the third opening;

forming a fourth conductor over the second insulator and the third conductor;

forming a second resist mask in a pattern over the fourth conductor;

etching the fourth conductor using the second resist mask and an etching gas to form a fifth conductor; and

removing the second resist mask,

wherein the second hard mask and the fourth conductor comprise the same kind of metal element.

20. The method for manufacturing a semiconductor device, according to claim 19,

wherein the first hard mask comprises a third hard mask and a fourth hard mask over the third hard mask,

wherein the third hard mask is a conductor, and

wherein the fourth hard mask is an insulator.

21. The method for manufacturing a semiconductor device, according to claim 20, wherein the third hard mask and the fourth conductor comprise the same kind of metal element.

22. The method for manufacturing a semiconductor device, according to claim 19,

wherein the fourth conductor comprises a plurality of stacked conductive films, and

wherein a lowermost conductive film of the fourth conductor and the second hard mask are etched with the etching gas.

23. The method for manufacturing a semiconductor device, according to claim 22, wherein the second hard mask and the lowermost conductive film of the fourth conductor comprise the same kind of metal element.

24. The method for manufacturing a semiconductor device, according to claim 19, wherein a region of the second hard mask not overlapping with the second resist mask is removed when etching the fourth conductor, so that a region of the second hard mask remains only in a region overlapping with the fifth conductor.