WHAT IS CLAIMED IS:

1. A method for manufacturing an SOI substrate, comprising the steps of:

adding hydrogen to a single crystal semiconductor substrate so that an embrittled region is formed in a region at a predetermined depth from a surface of the single crystal semiconductor substrate;

bonding the single crystal semiconductor substrate to a base substrate with an insulating layer interposed therebetween;

heating the single crystal semiconductor substrate to be separated along the embrittled region, whereby a semiconductor layer is provided over the base substrate with the insulating layer interposed therebetween; and

melting at least a superficial part of the semiconductor layer,

wherein nitrogen is added to the semiconductor layer in the melting step so that the semiconductor layer includes a region having a nitrogen concentration of 1×10^{16} atoms/cm^3 or more.

2. The method for manufacturing an SOI substrate according to claim 1, wherein carbon is further added to the semiconductor layer in the melting step, so that a concentration of carbon in the semiconductor layer is 1×10^{17} atoms/cm^3 or more.

3. The method for manufacturing an SOI substrate according to claim 1, wherein melting is performed by irradiating the semiconductor layer with a laser beam.

4. The method for manufacturing an SOI substrate according to claim 1, wherein melting is performed by strong light irradiation with a lamp.

5. The method for manufacturing an SOI substrate according to claim 3, wherein the superficial part of the semiconductor layer is melted while being sprayed with a gas containing at least one of nitrogen, oxygen, and carbon.

6. The method for manufacturing an SOI substrate according to claim 1, wherein at least one of nitrogen, oxygen, and carbon is added to the single crystal

semiconductor substrate at the same time as the addition of hydrogen.

7. The method for manufacturing an SOI substrate according to claim 1, wherein a silicon nitride film, a silicon oxide film, a silicon oxynitride film, or a silicon nitride oxide film is formed over the semiconductor layer before the superficial part of the semiconductor layer is melted.

8. The method for manufacturing an SOI substrate according to claim 1, wherein a glass substrate is used as the base substrate.

9. A method for manufacturing a semiconductor device comprising a transistor which is formed using the SOI substrate according to claim 1.

10. A method for manufacturing an SOI substrate, comprising the steps of:

adding hydrogen to a single crystal semiconductor substrate so that an embrittled region is formed in a region at a predetermined depth from a surface of the single crystal semiconductor substrate;

bonding the single crystal semiconductor substrate to a base substrate with an insulating layer interposed therebetween;

heating the single crystal semiconductor substrate to be separated along the embrittled region, whereby a semiconductor layer is provided over the base substrate with the insulating layer interposed therebetween; and

melting at least a superficial part of the semiconductor layer,

wherein oxygen is added to the semiconductor layer in the melting step so that the semiconductor layer includes a region having an oxygen concentration of 2×10^{18} atoms/cm^3 or more.

11. The method for manufacturing an SOI substrate, according to claim 10, wherein nitrogen is added to the semiconductor layer when the semiconductor layer is melted, so that a concentration of nitrogen in the semiconductor layer is 5×10^{15} atoms/cm^3 or more.

12. The method for manufacturing an SOI substrate according to claim 10, wherein carbon is further added to the semiconductor layer in the melting step, so that a concentration of carbon in the semiconductor layer is 1×10^{17} atoms/cm^3 or more.

13. The method for manufacturing an SOI substrate according to claim 10, wherein melting is performed by irradiating the semiconductor layer with a laser beam.

14. The method for manufacturing an SOI substrate according to claim 10, wherein melting is performed by strong light irradiation with a lamp.

15. The method for manufacturing an SOI substrate according to claim 13, wherein the superficial part of the semiconductor layer is melted while being sprayed with a gas containing at least one of nitrogen, oxygen, and carbon.

16. The method for manufacturing an SOI substrate according to claim 10, wherein at least one of nitrogen, oxygen, and carbon is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen.

17. The method for manufacturing an SOI substrate according to claim 10, wherein a silicon nitride film, a silicon oxide film, a silicon oxynitride film, or a silicon nitride oxide film is formed over the semiconductor layer before the superficial part of the semiconductor layer is melted.

18. The method for manufacturing an SOI substrate according to claim 10, wherein a glass substrate is used as the base substrate.

19. A method for manufacturing a semiconductor device comprising a transistor which is formed using the SOI substrate according to claim 10.

20. A method for manufacturing an SOI substrate, comprising the steps of:

adding hydrogen to a single crystal semiconductor substrate so that an

embrittled region is formed in a region at a predetermined depth from a surface of the single crystal semiconductor substrate;

bonding the single crystal semiconductor substrate to a base substrate with an insulating layer interposed therebetween; and

heating the single crystal semiconductor substrate to be separated along the embrittled region, whereby a semiconductor layer is provided over the base substrate with the insulating layer interposed therebetween,

wherein nitrogen is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen, so that the semiconductor layer includes a region having a nitrogen concentration of 1×10^{16} atoms/cm^3 or more.

21. The method for manufacturing an SOI substrate according to claim 20, wherein carbon is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen, so that a concentration of carbon in the semiconductor layer is 1×10^{17} atoms/cm^3 or more.

22. The method for manufacturing an SOI substrate according to claim 20, wherein a glass substrate is used as the base substrate.

23. A method for manufacturing a semiconductor device comprising a transistor which is formed using the SOI substrate according to claim 20.

24. A method for manufacturing an SOI substrate, comprising the steps of:

adding hydrogen to a single crystal semiconductor substrate so that an embrittled region is formed in a region at a predetermined depth from a surface of the single crystal semiconductor substrate;

bonding the single crystal semiconductor substrate to a base substrate with an insulating layer interposed therebetween; and

heating the single crystal semiconductor substrate to be separated along the embrittled region, whereby a semiconductor layer is provided over the base substrate with the insulating layer interposed therebetween,

wherein oxygen is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen, so that the semiconductor layer includes a region having an oxygen concentration of 2×10^{18} atoms/cm^3 or more.

25. The method for manufacturing an SOI substrate, according to claim 24, wherein nitrogen is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen, so that a concentration of nitrogen in the semiconductor layer is 5×10^{15} atoms/cm^3 or more.

26. The method for manufacturing an SOI substrate, according to claim 24, wherein carbon is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen, so that a concentration of carbon in the semiconductor layer is 1×10^{17} atoms/cm^3 or more.

27. The method for manufacturing an SOI substrate, according to claim 24, wherein a glass substrate is used as the base substrate.

28. A method for manufacturing a semiconductor device comprising a transistor which is formed using the SOI substrate according to claim 24.

29. An SOI substrate comprising a base substrate, an insulating layer over the base substrate, and a semiconductor layer over the insulating layer,

wherein a concentration of nitrogen in the semiconductor layer is 5×10^{15} atoms/cm^3 or more.

30. A semiconductor device manufactured with the SOI substrate according to claim 29.

31. An SOI substrate comprising a base substrate, an insulating layer over the base substrate, and a semiconductor layer over the insulating layer,

wherein a concentration of oxygen in the semiconductor layer is 2×10^{18}

atoms/cm^3 or more.

32. A semiconductor device manufactured with the SOI substrate according to claim 31.

33. An SOI substrate comprising a base substrate, an insulating layer over the base substrate, and a semiconductor layer over the insulating layer,

wherein a concentration of carbon in the semiconductor layer is 1×10^{17} atoms/cm^3 or more.

34. A semiconductor device manufactured with the SOI substrate according to claim 33.

What is claimed is:

1. A method for manufacturing an SOI substrate, comprising the steps of:

adding hydrogen to a single crystal semiconductor substrate so that an embrittled region is formed in a region at a predetermined depth from a surface of the single crystal semiconductor substrate;

bonding the single crystal semiconductor substrate to a base substrate with an insulating layer interposed therebetween;

heating the single crystal semiconductor substrate to be separated along the embrittled region, whereby a semiconductor layer is provided over the base substrate with the insulating layer interposed therebetween; and

melting at least a superficial part of the semiconductor layer,

wherein oxygen is added to the semiconductor layer in the melting step so that the semiconductor layer includes a region having an oxygen concentration of 2×10^{18} atoms/cm^3 or more.

2. The method for manufacturing an SOI substrate, according to claim 1, wherein nitrogen is added to the semiconductor layer when the semiconductor layer is melted, so that a concentration of nitrogen in the semiconductor layer is 5×10^{15} atoms/cm^3 or more.

3. The method for manufacturing an SOI substrate according to claim 1, wherein carbon is further added to the semiconductor layer in the melting step, so that a concentration of carbon in the semiconductor layer is 1×10^{17} atoms/cm^3 or more.

4. The method for manufacturing an SOI substrate according to claim 1, wherein melting is performed by irradiating the semiconductor layer with a laser beam.

5. The method for manufacturing an SOI substrate according to claim 1, wherein melting is performed by strong light irradiation with a lamp.

6. The method for manufacturing an SOI substrate according to claim 1, wherein the superficial part of the semiconductor layer is melted while being sprayed with a gas containing at least one of nitrogen, oxygen, and carbon.

7. The method for manufacturing an SOI substrate according to claim 1, wherein at least one of nitrogen, oxygen, and carbon is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen.

8. The method for manufacturing an SOI substrate according to claim 1, wherein a silicon nitride film, a silicon oxide film, a silicon oxynitride film, or a silicon nitride oxide film is formed over the semiconductor layer before the superficial part of the semiconductor layer is melted.

9. The method for manufacturing an SOI substrate according to claim 1, wherein a glass substrate is used as the base substrate.

10. A method for manufacturing a semiconductor device comprising a transistor which is formed using the SOI substrate according to claim 1.

11. A method for manufacturing an SOI substrate, comprising the steps of:

adding hydrogen to a single crystal semiconductor substrate so that an embrittled region is formed in a region at a predetermined depth from a surface of the single crystal semiconductor substrate;

bonding the single crystal semiconductor substrate to a base substrate with an insulating layer interposed therebetween;

heating the single crystal semiconductor substrate to be separated along the embrittled region, whereby a semiconductor layer is provided over the base substrate with the insulating layer interposed therebetween; and

melting at least a superficial part of the semiconductor layer,

wherein nitrogen is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen and to the semiconductor layer in the melting step, so that

the semiconductor layer includes a region having a nitrogen concentration of 1×10^{16} atoms/cm^3 or more, and

wherein oxygen is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen and to the semiconductor layer in the melting step, so that the semiconductor layer includes a region having an oxygen concentration of 2×10^{18} atoms/cm^3 or more.

12. The method for manufacturing an SOI substrate, according to claim 11, wherein carbon is added to the single crystal semiconductor substrate at the same time as the addition of hydrogen, so that a concentration of carbon in the semiconductor layer is 1×10^{17} atoms/cm^3 or more.

13. The method for manufacturing an SOI substrate, according to claim 11, wherein a glass substrate is used as the base substrate.

14. A method for manufacturing a semiconductor device comprising a transistor which is formed using the SOI substrate according to claim 11.

15. The method for manufacturing an SOI substrate according to claim 11, wherein melting is performed by irradiating the semiconductor layer with a laser beam.

16. The method for manufacturing an SOI substrate according to claim 11, wherein melting is performed by strong light irradiation with a lamp.

17. The method for manufacturing an SOI substrate according to claim 11, wherein the superficial part of the semiconductor layer is melted while being sprayed with a gas containing at least one of nitrogen, oxygen, and carbon.

18. The method for manufacturing an SOI substrate according to claim 11, wherein a silicon nitride film, a silicon oxide film, a silicon oxynitride film, or a silicon nitride oxide film is formed over the semiconductor layer before the superficial part of the semiconductor layer is melted.