CLAIMS

1. An Ag alloy bonding wire for semiconductor devices, being made of an Ag alloy that contains one or more elements selected from the group consisting of Te, Bi and Sb (hereinafter referred to as a "first element") and one or more elements selected from the group consisting of Pd, Pt, In and Ga (hereinafter referred to as a "second element") and satisfies at least one of the following conditions (1) to (3):

(1) a concentration of Te is 5 to 500 at. ppm;

(2) a concentration of Bi is 5 to 500 at. ppm; and

(3) a concentration of Sb is 5 to 1,500 at. Ppm

wherein

the Ag alloy bonding wire contains In as the second element, and

the total concentration of the second element in the wire is 0.05 at.% or more and 3 at.% or less.

2. An Ag alloy bonding wire for semiconductor devices, being made of an Ag alloy that contains one or more elements selected from the group consisting of Te, Bi and Sb (hereinafter referred to as a "first element") and one or more elements selected from the group consisting of Pd, Pt, In and Ga (hereinafter referred to as a "second element") and satisfies at least one of the following conditions (1) to (3):

(1) a concentration of Te is 5 to 500 at. ppm;

(2) a concentration of Bi is 5 to 500 at. ppm; and

(3) a concentration of Sb is 5 to 1,500 at. ppm,

wherein

the Ag alloy bonding wire contains Ga as the second element, and

the total concentration of the second element in the

wire is 0.05 at.% or more and 3 at.% or less.

3. An Ag alloy bonding wire for semiconductor devices, being made of an Ag alloy that contains one or more elements selected from the group consisting of Te, Bi and Sb (hereinafter referred to as a "first element") and one or more elements selected from the group consisting of Pd, Pt, In and Ga (hereinafter referred to as a "second element") and satisfies at least one of the following conditions (1) to (3):

(1) a concentration of Te is 5 to 500 at. ppm;

(2) a concentration of Bi is 5 to 500 at. ppm; and

(3) a concentration of Sb is 5 to 1,500 at. ppm,

wherein

the total concentration of the second element in the wire is 0.05 at.% or more and 3 at.% or less, and

the concentration of Pt in the wire is 0.1 at.% or less.

4. An Ag alloy bonding wire for semiconductor devices, being made of an Ag alloy that contains one or more elements selected from the group consisting of Te, Bi and Sb (hereinafter referred to as a "first element") and one or more elements selected from the group consisting of Pd, Pt, In and Ga (hereinafter referred to as a "second element") and satisfies at least one of the following conditions (1) to (3):

(1) a concentration of Te is 5 to 500 at. ppm;

(2) a concentration of Bi is 5 to 500 at. ppm; and

(3) a concentration of Sb is 5 to 1,500 at. ppm,

wherein

the total concentration of the second element in the wire is 0.05 at.% or more and 1 at.% or less.

5. An Ag alloy bonding wire for semiconductor devices, being made of an Ag alloy that contains one or more elements selected from the group consisting of Te, Bi and Sb (hereinafter referred to as a "first element") and one or more elements selected from the group consisting of Pd, Pt, In and Ga (hereinafter referred to as a "second element") and satisfies at least one of the following conditions (1) to (3):

(1) a concentration of Te is 5 to 500 at. ppm;

(2) a concentration of Bi is 5 to 500 at. ppm; and

(3) a concentration of Sb is 5 to 1,500 at. ppm,

wherein

the Ag alloy bonding wire contains two or more elements among the first element, and

the total concentration of the second element in the wire is 0.05 at.% or more and 3 at.% or less.

6. An Ag alloy bonding wire for semiconductor devices, being made of an Ag alloy that contains one or more elements selected from the group consisting of Te, Bi and Sb (hereinafter referred to as a "first element") and one or more elements selected from the group consisting of Pd, Pt, In and Ga (hereinafter referred to as a "second element") and satisfies at least one of the following conditions (1) to (3):

(1) a concentration of Te is 5 to 500 at. ppm;

(2) a concentration of Bi is 5 to 500 at. ppm; and

(3) a concentration of Sb is 5 to 1,500 at. ppm,

wherein

the total concentration of the second element in the wire is 0.05 at.% or more and 3 at.% or less, and

the Ag alloy bonding wire substantially contains only

one element of Pd, Pt, In and Ga among the second element.

7. The Ag alloy bonding wire according to any one of claims 1 to 6, wherein the concentration of Pt in the wire is 0.06 at.% or less.

8. The Ag alloy bonding wire according to any one of claims 1 to 7, wherein the Ag alloy bonding wire satisfies any two of the conditions (1) to (3) or all of the conditions (1) to (3).

9. The Ag alloy bonding wire according to any one of claims 1 to 8, wherein the Ag alloy bonding wire does not have a coating that contains a metal other than Ag as a main component.

10. The Ag alloy bonding wire according to any one of claims 1 to 9, wherein the total concentration of Ca and the rare earth element in the wire is less than 20 at. ppm.

11. The Ag alloy bonding wire according to any one of claims 1 to 10, wherein the total concentration of Ca and the rare earth element in the wire is 12 at. ppm or less.

12. The Ag alloy bonding wire according to any one of claims 1 to 11, wherein a total concentration of elements other than the first element, the second element and Ag is 0.1 at.% or less.

13. The Ag alloy bonding wire according to any one of claims 1 to 12, wherein a balance of the Ag alloy consists of Ag and inevitable impurities.

14. The Ag alloy bonding wire according to any one of claims 1 to 13, wherein the concentration of Sb is 900 to 1,500 at. ppm regarding the condition (3).

15. The Ag alloy bonding wire according to any one of claims 1 to 14, wherein the concentration of each element is a concentration measured by an ICP emission spectrometry or an ICP mass spectrometry.

16. A semiconductor device comprising the Ag alloy bonding wire according to any one of claims 1 to 15.