1. A semiconductor device bonding wire comprising:

a core material whose components include copper as a main component;

an outer layer provided on said core material, said outer layer containing a metal M and copper, being a region having 0.021 to 0.12μm thickness where a concentration of said metal M is 50mol% or more, wherein

said metal M constituting said outer layer includes at least one element selected between Au and Pd as a main component.

2. The semiconductor device bonding wire according to claim 1, wherein said outer layer contains at least one element selected from among Bi, P, Se and Tl, and an elemental concentration of said at least one element on an outermost surface of said outer layer is in a range of from 0.01 to 5mol% in total.

3. The semiconductor device bonding wire according to claim 1 or 2, wherein a diffusion layer is provided between said outer layer and said core material.

4. The semiconductor device bonding wire according to any one of claims 1 to 3, wherein a region where a concentration of said metal M relative to a total of the metallic elements is 10mol% or more is 0.03 to 0.2μm in thickness.

5. The semiconductor device bonding wire according to any one of claims 1 to 4, wherein a region inside said outer layer where a total concentration of said metal M

relative to a total of the metallic elements is 90mol% or more is 0.004 to 0.07μm in thickness.

6. The semiconductor device bonding wire according to any one of claims 1 to 5, wherein a region inside said outer layer where a total concentration of said metal M relative to a total of the metallic elements is 96mol% or more is 0.002 to 0.06μm in thickness.

7. The semiconductor device bonding wire according to any one of claims 1 to 6, wherein a copper concentration relative to a total of the metallic elements in the outermost layer of the outer layer is 0.5 to 45mol%.

8. The semiconductor device bonding wire according to any one of claims 1 to 7, wherein a region in the surface of said outer layer where a copper concentration relative to a total of the metallic elements is in a range of from 1 to 30mol% is 0.0005 to 0.008μm in thickness.

9. The semiconductor device bonding wire according to any one of claims 1 to 8, wherein a concentration of said metal M, which is contained in an entire wire and is other than copper, relative to a total of the metallic elements is in a range of from 0.05 to 3mol%.

Claims

1. A semiconductor device bonding wire comprising:

a core material where a concentration of copper is 50mol% or more relative to a total concentration of copper and metal M, and a detected concentration of said metal M is less than 50mol% in total;

an outer layer provided on said core material, said outer layer containing said metal M and copper, being a region having 0.021 to 0.12μm thickness where a concentration of said metal M is 50mol% or more, and

a diffusion layer where a detected concentration of said metal M is 10mol% or more and less than 50mol% in total, said diffusion layer being provided between said outer layer and said core material, wherein

said metal M constituting said outer layer includes at least one of Au and Pd, and

a region where a concentration of said metal M relative to a total of the metallic elements is 10mol% or more is 0.03 to 0.2μm in thickness.

2. The semiconductor device bonding wire according to claim 1, wherein said outer layer contains at least one element selected from among Bi, P, Se and Tl, and an elemental concentration of said at least one element on the outermost surface of said outer layer is in a range of from 0.01 to 5mol% in total.

3. The semiconductor device bonding wire according to claim 1 or 2, wherein a region inside said outer layer where a total concentration of said metal M relative to a total of the metallic elements is 90mol% or more is 0.004 to 0.07μm in thickness.

4. The semiconductor device bonding wire according to any one of claims 1 to 3, wherein a region inside said outer layer where a total concentration of said metal M relative to a total of the metallic elements is 96mol% or more is 0.002 to 0.06μm in thickness.

5. The semiconductor device bonding wire according to any one of claims 1 to 4, wherein a copper concentration relative to a total of the metallic elements in the outermost surface of said outer layer is 0.5 to 45mol%.

6. The semiconductor device bonding wire according to any one of claims 1 to

5, wherein a region in the surface of said outer layer where a copper concentration relative to a total of the metallic elements is in a range of from 1 to 30mol% is 0.0005 to 0.008μm in thickness.

7. The semiconductor device bonding wire according to any one of claims 1 to 8, wherein a concentration of said metal M, which is contained in an entire wire and is other than copper, relative to a total of the metallic elements is in a range of from 0.05 to 3mol%.