

CLAIMS

1. A bonding wire for a semiconductor device comprising:
a Cu alloy core material; and

5 a Pd coating layer formed on a surface of the Cu alloy
core material, wherein

the bonding wire contains at least one or more first
elements selected from As and Te; and at least one or more
second elements selected from Sn, Sb, Bi and Se,

10 a concentration of the first elements and the second
elements in total is 0.1 ppm by mass or more and 100 ppm by
mass or less relative to the entire wire, and

$\text{Sn} \leq 10$ ppm by mass; $\text{Sb} \leq 10$ ppm by mass; and $\text{Bi} \leq 1$
ppm by mass.

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2. A bonding wire for a semiconductor device comprising:
a Cu alloy core material; and

a Pd coating layer formed on a surface of the Cu alloy
core material, wherein

20 the bonding wire contains at least one or more first
elements selected from As and Te,

a concentration of the first elements in total is 0.1
ppm by mass or more and 100 ppm by mass or less relative to
the entire wire, and meets at least one of the following

25 conditions:

(i) a concentration of As is 2.5 ppm by mass or more,
when the bonding wire contains As; and

(ii) a concentration of Te is 0.2 ppm by mass or more,
when the bonding wire contains Te.

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3. The bonding wire for a semiconductor device according
to claim 1 or 2, wherein the concentration of at least one
or more elements selected from As, Te, Sn, Sb, Bi and Se in

total is 1 ppm by mass or more and 100 ppm by mass or less relative to the entire wire.

4. The bonding wire for a semiconductor device according
5 to any one of claims 1 to 3, wherein a thickness of the Pd coating layer is 0.015 μm or more and 0.150 μm or less.

5. The bonding wire for a semiconductor device according
to any one of claims 1 to 4, further comprising an alloy
10 skin layer containing Au and Pd on the Pd coating layer.

6. The bonding wire for a semiconductor device according
to claim 5, wherein a thickness of the alloy skin layer
containing Au and Pd is 0.0005 μm or more and 0.050 μm or
15 less.

7. The bonding wire for a semiconductor device according
to any one of claims 1 to 6, wherein
the bonding wire further contains at least one or more
20 third elements selected from Ni, Zn, Rh, In, Ir, Pt, Ga and Ge, and
a concentration of each of the third elements is
0.011% by mass or more and 1.2% by mass or less relative to
the entire wire.

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8. The bonding wire for a semiconductor device according
to any one of claims 1 to 7, wherein
the Cu alloy core material contains Pd, and
a concentration of Pd contained in the Cu alloy core
30 material is 0.05% by mass or more and 1.2% by mass or less.

9. The bonding wire for a semiconductor device according
to any one of claims 1 to 8, wherein

the bonding wire further contains at least one or more fourth elements selected from B, P, Mg, Ca and La, and

a concentration of each of the fourth elements is 1 ppm by mass or more and 100 ppm by mass or less relative to the entire wire.

10. The bonding wire for a semiconductor device according to any one of claims 1 to 9, wherein, in a measurement result when measuring crystal orientations on a surface of the bonding wire, a crystal orientation $\langle 111 \rangle$ angled at 15 degrees or less to a longitudinal direction of the bonding wire has a proportion of 30% or more and 100% or less.

11. The bonding wire for a semiconductor device according to any one of claims 1 to 10, wherein Cu is present at an outermost surface of the bonding wire.