CLAIMS

[Claim 1] A mixed silver powder for which, in a particle size distribution with volume distribution proportion on a vertical axis and particle diameter on a horizontal axis that is obtained through measurement by the following procedure,,

the particle size distribution includes a first peak and a second peak that each have a volume distribution proportion of 1% or more,

a relationship between a particle diameter d_{M1} of the first peak and a particle diameter d_{M2} of the second peak satisfies formula (I) and formula (II), shown below:

$d_{M1} < d_{M2}$ ⋯ (I)

$4.5\ \mu m \leq d_{M2} - d_{M1} \leq 16.0\ \mu m$ ⋯ (II)

a relationship between a volume distribution proportion A of whichever of the first peak and the second peak has a smaller volume distribution proportion and a volume distribution proportion B that is a minimum volume distribution proportion between the first peak and the second peak satisfies formula (III) or formula (IV), shown below:

$1.2 \leq A/B$ ⋯ (III)

$0 = B/A$ ⋯ (IV)

and the mixed silver powder has a tap density of 3.5 g/cm^3 or more.

(Particle size distribution measurement procedure)
The particle size distribution is obtained by adding 0.1g of the mixed silver powder to 40mL of isopropyl alcohol, performing 2 minutes of dispersing at 19.5 kHz using an ultrasonic homogenizer having a tip diameter of 18mm, and then performing wet measurement using a laser diffraction particle size distribution measurement instrument.

[Claim 2] A mixed silver powder for which, in a particle size distribution with volume distribution proportion on a vertical axis and particle diameter on a horizontal axis that is obtained through measurement by the following procedure,

the particle size distribution includes a first peak and a second peak that each have a volume distribution proportion of 1% or more,

a relationship between a particle diameter d_{M1} of the first peak and a particle diameter d_{M2} of the second peak satisfies formula (I) and formula (II), shown below:

$d_{M1} < d_{M2} \cdots$ (I)

$4.5\ \mu m \leq d_{M2} - d_{M1} \leq 16.0\ \mu m \cdots$ (II)

a relationship between a volume distribution proportion A of whichever of the first peak and the second peak has a smaller volume distribution proportion and a volume distribution proportion B that is a minimum volume distribution proportion between the first peak and the second peak satisfies formula (III) or formula (IV), shown below:

$1.2 \leq A/B \cdots$ (III)

$0 = B/A \cdots$ (IV)

and more than 50% of the volume distribution proportion of the first peak originates from a spherical silver powder, and more than 50% of the volume distribution proportion of the second peak originates from a flake-like silver powder.

(Particle size distribution measurement procedure)
The particle size distribution is obtained by adding 0.1g of the mixed silver powder to 40mL of isopropyl alcohol, performing 2 minutes of dispersing at 19.5 kHz using an ultrasonic homogenizer having a tip diameter of 18mm, and then performing wet measurement using a laser diffraction particle size distribution measurement instrument.

[Claim 3] The mixed silver powder according to claim 1, wherein

d_{M1} is not less than 0.5 μm and not more than 1.5 μm, and

d_{M2} is not less than 5.0 μm and not more than 17.5 μm.

[Claim 4] A mixed silver powder for which, in a particle size distribution with volume distribution proportion on a vertical axis and particle diameter on a horizontal axis that is obtained through measurement by the following procedure,

the particle size distribution includes a first peak and a second peak that each have a volume distribution proportion of 1% or more,

a relationship between a particle diameter d_{M1} of the first peak and a particle diameter d_{M2} of the second peak satisfies formula (I)

and formula (II), shown below:

$d_{M1} < d_{M2} \cdots$ (I)

$4.5\ \mu m \leq d_{M2} - d_{M1} \leq 16.0\ \mu m \cdots$ (II)

a relationship between a volume distribution proportion A of whichever of the first peak and the second peak has a smaller volume distribution proportion and a volume distribution proportion B that is a minimum volume distribution proportion between the first peak and the second peak satisfies formula (III) or formula (IV), shown below:

$1.2 \leq A/B \cdots$ (III)

$0 = B/A \cdots$ (IV)

and a ratio of ignition loss relative to BET specific surface area of the mixed silver powder is 0.65 or less.

(Particle size distribution measurement procedure)

The particle size distribution is obtained by adding 0.1g of the mixed silver powder to 40mL of isopropyl alcohol, performing 2 minutes of dispersing at 19.5 kHz using an ultrasonic homogenizer having a tip diameter of 18mm, and then performing wet measurement using a laser diffraction particle size distribution measurement instrument.

[Claim 5] A method of producing a mixed silver powder comprising a mixing step of mixing a first silver powder and a second silver powder, wherein, in particle size distributions with volume distribution proportion on a vertical axis and particle diameter on a horizontal axis that are respectively obtained through measurement of the first silver powder and the second silver powder by the following procedure,

a relationship between a particle diameter d_{S1} of a peak where volume distribution proportion is at a maximum for the first silver powder and a particle diameter d_{S2} of a peak where volume distribution proportion is at a maximum for the second silver powder satisfies formula (i) and formula (ii), shown below:

$d_{S1} < d_{S2} \cdots$ (i)

$4.6\ \mu m \leq d_{S2} - d_{S1} \leq 16.0\ \mu m \cdots$ (ii)

and a relationship between a 94^{th} percentile diameter D_{94} of the first silver powder and a 6^{th} percentile diameter D_6 of the second silver

powder satisfies formula (iii), shown below:

$D_{94} \leq D_6 \cdots$ (iii).

(Particle size distribution measurement procedure)

The particle size distribution is obtained by adding 0.1g of the first silver powder and 0.1g of the second silver powder, respectively, to 40mL of isopropyl alcohol or 40 mL of an isopropyl alcohol solution containing polyvinylpyrrolidone at a concentration of 1% by weight, performing 2 minutes of dispersing at 19.5 kHz using an ultrasonic homogenizer having a tip diameter of 18mm, and then performing wet measurement using a laser diffraction particle size distribution measurement instrument.

[Claim 6] The method of producing a mixed silver powder according to claim 5, wherein the first silver powder is a spherical silver powder, and the second silver powder is a flake-like silver powder.

[Claim 7] The method of producing a mixed silver powder according to claim 6, wherein

the spherical silver powder has a 50^{th} percentile diameter D_{50} of not less than 0.5 μm and not more than 1.5 μm, a tap density of 2.0 g/cm^3 or more, and a BET specific surface area of not less than 0.6 m^2/g and not more than 2.2 m^2/g, and

the flake-like silver powder has a 50^{th} percentile diameter D_{50} of not less than 5.0 μm and not more than 17.5 μm, a tap density of 2.0 g/cm^3 or more, a BET specific surface area of not less than 0.2 m^2/g and not more than 2.0 m^2/g, and an aspect ratio of 3 or more.

[Claim 8] A metal paste for bonding comprising a mixed silver powder, wherein

in a particle size distribution of the mixed silver powder with volume distribution of the mixed silver powder with volume distribution proportion on a vertical axis and particle diameter on a horizontal axis that is obtained through measurement by the following procedure,

the particle size distribution includes a first peak and a second

peak that each have a volume distribution proportion of 1% or more,

a relationship between a particle diameter d_{M1} of the first peak and a particle diameter d_{M2} of the second peak satisfies formula (I) and formula (II), shown below:

$$d_{M1} < d_{M2} \cdots (I)$$

$$4.5\ \mu m \leq d_{M2} - d_{M1} \leq 16.0\ \mu m \cdots (II)$$

a relationship between a volume distribution proportion A of whichever of the first peak and the second peak has a smaller volume distribution proportion and a volume distribution proportion B that is a minimum volume distribution proportion between the first peak and the second peak satisfies formula (III) or formula (IV), shown below:

$$1.2 \leq A/B \cdots (III)$$

$$0 = B/A \cdots (IV)$$

(Particle size distribution measurement procedure)

The particle size distribution is obtained by adding 0.1g of the mixed silver powder to 40mL of isopropyl alcohol, performing 2 minutes of dispersing at 19.5 kHz using an ultrasonic homogenizer having a tip diameter of 18mm, and then performing wet measurement using a laser diffraction particle size distribution measurement instrument.