sealed with a fluorinated passive film having a thickness of 8 nm or greater, wherein the nickel-containing plating film layer comprises phosphorus, and wherein the fluorinated passive film is formed only on an exposed surface of the nickel-phosphorus alloy plating layer.

[0007b]

In another aspect, the present disclosure refers to a constituent member of a semiconductor production device, made up of the laminate as disclosed herein.

[0007c]

In a further aspect, the present disclosure refers to a method for producing a laminate as disclosed herein, comprising

a step (A) of forming the nickel-containing plating film layer which comprises phosphorus on the metallic base material,

a step (B) of forming the gold plating film layer on the nickel-containing plating film layer, and

a sealing treatment step (C) of forming the fluorinated passive film having a thickness of 8 nm or greater in pinholes in the gold plating film layer wherein the sealing treatment step (C) is performed in an atmosphere in which a fluorinated gas concentration is 8% by volume or higher and a temperature is 100 to 150°C.

Technical Problem

[0008]

What is intended by the present invention is to resolve the above problems associated with conventional art. The objects of the present invention are to provide a metallic material which can be employed as a constituent member of a semiconductor production device and also excels in corrosion

CLAIMS

[Claim 1]

A laminate comprising a metallic base material, a nickel-containing plating film layer formed on the metallic base material, and a gold plating film layer formed on the nickel-containing plating film layer, wherein the nickel-containing plating layer has a nickel content of 80% by mass or higher in relation to 100% by mass of the entirety of the nickel-containing plating layer,

wherein pinholes in the gold plating film layer are sealed with a fluorinated passive film having a thickness of 8 nm or greater,

wherein the nickel-containing plating film layer comprises phosphorus, and

wherein the fluorinated passive film is formed only on an exposed surface of the nickel-phosphorus alloy plating layer.

[Claim 2]

The laminate according to claim 1, wherein the metallic base material comprises at least a metal selected from the group consisting of stainless steel, iron, aluminum, aluminum alloys, copper, and copper alloys.

[Claim 3]

The laminate according to claim 1 or 2, having a nickel strike layer between the metallic base material and the

nickel-containing plating film layer.

[Claim 4]

The laminate according to any one of claims 1 to 3, wherein the nickel-containing plating film layer comprises a nickel-phosphorus alloy plating layer (1) having a phosphorus concentration of 8% by mass or higher and lower than 10% by mass, and a nickel-phosphorus alloy plating layer (2) having a phosphorus concentration of 10% by mass or higher and 12% by mass or lower in this order from the metallic base material.

[Claim 5]

The laminate according to any one of claims 1 to 4, wherein the gold plating film layer comprises a displacement gold plating film layer and a reduction gold plating film layer in this order from the nickel-containing plating film layer.

[Claim 6]

A constituent member of a semiconductor production device, made up of the laminate according to any one of claims 1 to 5.

[Claim 7]

A method for producing a laminate according to any one of claims 1 to 5, comprising

a step (A) of forming the nickel-containing plating

film layer which comprises phosphorus on the metallic base material,

a step (B) of forming the gold plating film layer on the nickel-containing plating film layer, and

a sealing treatment step (C) of forming the fluorinated passive film having a thickness of 8 nm or greater in pinholes in the gold plating film layer, wherein the sealing treatment step (C) is performed in an atmosphere in which a fluorinated gas concentration is 8% by volume or higher and a temperature is 100 to 150°C.

[Claim 8]

The method for producing a laminate according to claim 7, wherein the metallic base material comprises at least one metal selected from the group consisting of stainless steel, iron, aluminum, aluminum alloys, copper, and copper alloys.

[Claim 9]

The method for producing a laminate according to claim 7 or 8, comprising a step of subjecting the metallic base material to a nickel strike treatment under the condition of a current density of 5 to 20 A/dm^2 before the step (A).

[Claim 10]

The method for producing a laminate according to any one of claims 7 to 9, wherein the step (A) comprises a step (a1) of forming the nickel-phosphorus alloy plating layer (1)

having a phosphorus concentration of 8% by mass or higher and lower than 10% by mass, and a step (a2) of forming the nickel-phosphorus alloy plating layer (2) having a phosphorus concentration of 10% by mass or higher and 12% by mass or lower after the step (a1).

[Claim 11]

The method for producing a laminate according to any one of claims 7 to 10, wherein the step (B) comprises a step (b1) of forming the displacement gold plating film layer, and a step (b2) of forming the reduction gold plating film layer after the step (b1).