material is plated with a nickel-tungsten alloy and a thick fluorinated passive film of nickel is formed at a low temperature by utilizing the standard enthalpy of formation of WF_6 formed by a fluorination reaction. However, the method, which is electroplating, has a restriction such that members to which the method is applicable are limited (see Patent Literature 4).

Citation List

Patent Literature

[0007]

Patent Literature 1: JP 2954716 B2

Patent Literature 2: JP 3094000 B2

Patent Literature 3: JP 2004-360066 A

Patent Literature 4: JP 2008-056978 A

Summary

[0007a]

In a first aspect, the present disclosure refers to 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.

[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 a nickel-containing plating film layer which comprises phosphorus on a metallic base material,

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

a sealing treatment step (C) of forming a fluorinated passive film having a thickness of 8 nm or greater in pinholes in the gold plating film layer.

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 a nickel-containing plating film

layer which comprises phosphorus on a metallic base material,

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

a sealing treatment step (C) of forming a fluorinated passive film having a thickness of 8 nm or greater in pinholes in the gold plating film layer.

[Claim 8]

The method for producing a laminate according to claim 7, 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 9]

The method for producing a laminate according to claim 7 or 8, 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 10]

The method for producing a laminate according to any one of claims 7 to 9, 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 11]

The method for producing a laminate according to any one of claims 7 to 10, wherein the step (A) comprises a step (a1) of forming 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 step (a2) of forming a 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 12]

The method for producing a laminate according to any one of claims 7 to 11, wherein the step (B) comprises a step (b1) of forming a displacement gold plating film layer, and a step (b2) of forming a reduction gold plating film layer after the step (b1).