Citation List

Patent Literature

[0005]

Patent Literature 1: Japanese Patent Laid-Open No. 2008-174774

Summary ~~of Invention~~

Technical Problem

[0006]

In the plating method disclosed in Patent Literature 1, however, a palladium catalyst is provided before the formation of the electroless nickel plating film. Generally, providing a palladium catalyst is a necessary step for forming a electroless nickel plating film on the surface of a copper material. On the other hand, the palladium catalyst not only effects deposition of nickel on the surface of the copper material, but also has the following problem: the palladium catalyst is likely to remain on an insulated region between wiring patterns, and nickel is deposited in a gap between wiring patterns. Such a phenomenon tends to unfortunately cause failure in favorable plating on a fine wiring pattern.

[0007]

It is also considered that in the plating method disclosed in Patent Literature 1, the palladium plating film prevents local corrosion of nickel when plating with gold to thereby ensure the wire bonding property.

However, such a method causes the problem of resulting in high production costs.

[0008]

Accordingly, an object of the present ~~invention~~disclosure is to provide a electroless plating process that enables plating a fine wiring pattern and also enables reduction in production costs when obtaining a plating film having the excellent various mounting properties with solder and the excellent wire bonding property.

Solution to Problem

[0009]

In an aspect, ~~T~~the electroless plating process according to the present ~~invention~~ disclosure is a electroless plating process for forming~~producing~~ a nickel plating film and a gold plating film in this order on a surface of a copper material by a electroless plating method, the electroless plating process being characterized by comprising a step of producing a nickel plating film containing boron by a reductive electroless nickel strike plating method, and a step of producing a gold plating film by a reductive electroless gold plating method.

[0010]

The two-layer plating film according to the present ~~invention~~ disclosure is characterized in that it is a two-layer plating film produced by the above-described electroless

plating process, and consists of a nickel plating film containing boron and a gold plating film.

[0010a]

In another aspect, there is provided a two-layer plating film formed by the electroless plating process as defined above, consisting of a nickel plating film containing boron and a gold plating film.

Advantageous Effects ~~of Invention~~

[0011]

The electroless plating process according to the present ~~invention~~ disclosure is a electroless plating process for producing a nickel plating film and a gold plating film in this order on a surface of a copper material by a electroless plating method, the electroless plating process comprising: a step of producing a nickel plating film containing boron by a reductive electroless nickel strike plating method, and a step of producing a gold plating film by a reductive electroless gold plating method. Specifically, the electroless plating process according to the present ~~invention~~ disclosure enables production of a nickel plating film directly on the surface of a copper material without providing any palladium catalyst, and thus enables plating a fine wiring pattern. In addition, the electroless plating process according to the present disclosure~~invention~~ enables production of a gold plating film on the surface of the nickel plating film by the reductive electroless

gold plating method while preventing local corrosion of nickel without providing any palladium plating film, and thus enables production of plating films at a reduced cost.

[0012]

The two-layer plating film according to the present ~~invention~~ disclosure is a two-layer plating film consisting of a nickel plating film containing boron and a gold plating film. Since the two-layer plating film includes boron in the nickel plating film, diffusion of copper to the gold plating film is suppressed, and the two-layer plating film thus has the excellent various mounting properties with solder and the excellent wire bonding property without thickening the film thickness of the gold plating film.

Brief Description of Drawings

[0013]

[Figure 1] Figure 1 is a flowchart showing a electroless plating process of the present embodiment.

[Figure 2] Figure 2 is a schematic cross-sectional view of a two-layer plating film of the present embodiment.

[Figure 3] Figure 3 shows images of the cross-section of the interface moiety between the nickel plating film and the gold plating film in Example and Comparative Example 2.

[Figure 4] Figure 4 shows the measurement results of the shear strength of solder ball in Example and Comparative Examples 1 and 2.

[Figure 5] Figure 5 shows the confirmation results of the breaking mode of the solder balls in the measurement of