step, and thus may remain as defects. Thus, it is necessary to develop an electroless plating method that can obtain a smoother surface of a plating film.

[0005]

For example, Patent Literature 1 describes a method of smoothing the surface of a plating film by including metal ions of Group IV of the periodic table in a nitric acid bath used in a desmutting treatment in order to obtain a surface of a plating film without protrusion defects.

Citation List

Patent Literature

[0006]

Patent Literature 1: JP 3-236476 A (1991)

Summary ~~of Invention~~

Technical Problem

[0007]

The inventors of the present ~~invention~~disclosure have conducted concentrated studies and found that when iron ions are added to a nitric acid bath used for a desmutting treatment or a de-zincate treatment of a double zincate treatment, pits (recess defects) will be easily generated on the surface of the plating film although generation of nodules are reduced.

[0008]

The present ~~invention~~disclosure has been made in view of the foregoing, and it is an object of the present ~~invention~~disclosure to provide a plating pretreatment solution that can convert the surface of an aluminum substrate into a surface that is suitable for electroless nickel plating, and a method for producing an aluminum substrate for hard disk devices using the same.

Solution to Problem

[0009]

The treatment solution of the present ~~invention~~disclosure that solves the aforementioned problem is a plating pretreatment solution used for a plating pretreatment in production of an aluminum substrate for hard disk devices, and is characterized by containing iron ions at a concentration of 0.1 g/l to 1.0 g/l and nitric acid at a concentration of 2.0 wt% to 12.0 wt%.

[0010]

A production method for an aluminum substrate for hard disk devices that uses the plating pretreatment solution of the present ~~invention~~disclosure includes a double zincate treatment. In this case, the plating pretreatment solution of the present ~~invention~~disclosure can be used for both a desmutting treatment and a de-zincate treatment. Alternatively, the plating pretreatment solution may be used for either one of the desmutting treatment or the de-zincate treatment. The present ~~invention~~disclosure can be used not only for a pretreatment of Ni-P plating but also for a pretreatment of plating including Ni. For example, the present ~~invention~~disclosure can be used for a pretreatment of plating such as Ni-B, Ni-W, Ni-P-In, Ni-P-Mo, Ni-P-W, or Ni-P-B.

[0010a]

The present disclosure provides a production method for an aluminum substrate for hard disk devices, comprising a plating step of applying electroless Ni plating to an aluminum substrate, wherein

the electroless Ni plating is Ni-P plating,

a plating pretreatment solution is used for a pretreatment of the plating, the solution including iron ions at a concentration of 0.1 g/l to 1.0 g/l and nitric acid at a concentration of 2.0 wt% to 12.0 wt%, and the pretreatment including both a desmutting treatment and a de-zincate treatment performed after a zincate treatment, and the number of pits on the plated surface of the aluminium substrate is less than or equal to 0.105 counts/mm^2.

[0011]

With the plating pretreatment solution of the present ~~invention~~disclosure, an ultra-small amount of iron can be deposited on the substrate surface of the aluminum substrate, and in the following zincate treatment, uniform deposition of zinc can be promoted, starting from the iron, whereby the plated surface can be smoothed. Further, by controlling the nitric acid concentration to suppress excessive deposition of iron and prevent erosion of aluminum or erosion by nitric acid, it is possible to suppress generation of pits.

Advantageous Effects ~~of Invention~~

[0012]

According to the plating pretreatment solution of the present ~~invention~~disclosure, a plated surface can be smoothed in electroless nickel plating. In addition, generation of pits can be suppressed by controlling the nitric acid concentration of the plating pretreatment solution to be within the range of 2.0 to 12.0 wt%.

CLAIMS

[1] A production method for an aluminum substrate for hard disk devices, comprising a plating step of applying electroless Ni plating to an aluminum substrate, wherein
the electroless Ni plating is Ni-P plating,
a plating pretreatment solution is used for a pretreatment of the plating, the solution including iron ions at a concentration of 0.1 g/l to 1.0 g/l and nitric acid at a concentration of 2.0 wt% to 12.0 wt%, and the pretreatment including both a desmutting treatment and a de-zincate treatment performed after a zincate treatment, and the number of pits on the plated surface of the aluminium substrate is less than or equal to 0.105 counts/mm^2.

[2] The production method for an aluminum substrate for hard disk devices according to_claim_1, wherein the concentration of the nitric acid of the plating pretreatment solution is 5.0 wt% to 10.0 wt%.