[0003] However, the alkyd resin has a problem in that formaldehyde is generated when the resin is cured. Further, the epoxy ester dispersion resin has a problem in that its corrosion resistance is not sufficient. Accordingly, there is a demand for an anticorrosive coating material having additionally excellent performance.

[0004] Although a coating film formed with the anticorrosive coating material may, of course, be used by itself, an additional improvement in coating film performance may be attained when the coating film is processed into a multilayer through formation of another coating film (for example, on the coating film formed with the anticorrosive coating material). However, there is a problem in that, when adhesiveness between the coating films (interlayer adhesiveness) is low, sufficient performance may not be exerted.

Citation List

Non Patent Literature

[0005] [NPL 1] "Introduction to Environmentally Friendly Technologies, Environmentally Friendly Totally Water Based Anticorrosive Coating System," RUST PREVENTION & CONTROL JAPAN, 46, No. 1, 2002, p. 36-39

Summary ~~of Invention~~

Technical Problem

[0006] The present ~~invention~~disclosure has been made in order to solve the conventional problem, and a main object of the present ~~invention~~disclosure is to provide an aqueous coating composition excellent in corrosion resistance. Another object of the present ~~invention~~disclosure is to provide a method of forming a coating film having excellent corrosion resistance and being excellent in interlayer adhesiveness.

[0006a] In a first aspect of the present disclosure, there is provided a method of forming a coating film, comprising:

coating a substrate with an aqueous coating composition comprising:

an amine-modified epoxy resin (A) which is obtained by modifying an epoxy resin having a molecular weight of 2,000 or more, which is calculated with "epoxy equivalentx2", and having a bisphenol skeleton with an amine compound; and

a plasticizer (C) which has a boiling point of 200°C or more and is water-insoluble; and

subjecting the aqueous coating composition to air drying.

[0006b] In a second aspect of the present disclosure, there is provided a method of forming a multilayer coating film, comprising:

coating a substrate with the aqueous coating composition as defined above to form a coating film; and

forming a top coating layer on the coating film.

Means for solving the Problems

[0007] According to one aspect of the present invention, an aqueous coating composition is provided. The aqueous coating composition includes an amine-modified epoxy resin (A) which is obtained by modifying an epoxy resin having a molecular weight of 2,000 or more and having a bisphenol skeleton with an amine compound and a plasticizer (C) which has a boiling point of 200°C or more and is water-insoluble.

In one embodiment of the invention, a content of the plasticizer (C) is 10 to 30 parts by mass with respect to 100 parts by mass in total of the amine-modified epoxy resin (A) and the plasticizer (C).

In another embodiment of the invention, the amine-modified epoxy resin (A) has an amino group neutralized with an acid compound (B).

Claims

[Claim 1] A method of forming a coating film~~An aqueous coating composition~~, comprising:

coating a substrate with an aqueous coating composition comprising:

an amine-modified epoxy resin (A) which is obtained by modifying an epoxy resin having a molecular weight of 2,000 or more, which is calculated with "epoxy equivalentx2", and having a bisphenol skeleton with an amine compound; and

a plasticizer (C) which has a boiling point of 200°C or more and is water-insoluble; and

subjecting the aqueous coating composition to air drying.

[Claim 2] A method of forming a coating film ~~An aqueous coating composition~~ according to claim 1, wherein a content of the plasticizer (C) is 10 to 30 parts by mass with respect to 100 parts by mass in total of the amine-modified epoxy resin (A) and the plasticizer (C).

[Claim 3] A method of forming a coating film ~~An aqueous coating composition~~ according to claim 1 or 2, wherein the amine-modified epoxy resin (A) has an amino group neutralized with an acid compound (B).

[Claim 4] A method of forming a coating film ~~An aqueous coating composition~~ according to claim 3, wherein the amine-modified epoxy resin (A) has a neutralization ratio of 10 to 80%.

[Claim 5] A method of forming a coating film ~~An aqueous coating composition~~ according to any one of claims 1 to 4, wherein the amine-modified epoxy resin (A) has a modification rate of 1 to 10 mass%.

[Claim 6] A method of forming a coating film ~~An aqueous coating composition~~ according to any one of claims 1 to 5, wherein the plasticizer (C) has a water solubility of 10 parts by mass or less in 100 parts by mass of water.

~~[Claim 7] A method of forming a coating film, comprising coating a substrate with the aqueous coating composition according to any one of claims 1 to 6 to form a coating film.~~

[Claim ~~8~~7] A method of forming a multilayer coating film, comprising:

coating a substrate with the aqueous coating composition according to any one of claims 1 to 6 to form a coating film; and

forming a top coating layer on the coating film.

[Claim ~~9~~8] A method of forming a multilayer coating film according to claim ~~8~~7, further comprising forming an intermediate coating layer after the forming of the coating film with the aqueous coating composition and before the forming of the top coating layer.

[Claim ~~10~~9] A method of forming a multilayer coating film according to claim ~~8~~7 or ~~9~~8, further comprising forming an undercoating layer on the substrate before the forming of the coating film with the aqueous coating composition.